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THE PHILIPPINE
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NEW PHILIPPINE FERNS, X

BY EDWIN B. COPELAND
Of the University of California, Berkeley, California

FIVE PLATES

The species herein described are of recent collections. This paper is a part of the series; the last report was published in this Journal.*

The types, except as otherwise stated, are in my own herbarium; isotypes are in the Philippine National Herbarium.

ASPLENIUM SUBRESECTUM Copeland, sp. nov. **Plate 1.**

A. gregis A. unilateralis, rhizomate gracile 3 mm crasso, repente; stipite 15 cm alto, atropurpureo, glabro, sulcato; lamina 20–25 cm alta, 9–12 cm lata, apice attenuata, basi truncata, pinnata; pinnis subsessilibus, infimis deflexis, sequentibus falcatis, acutis, basi acroscopice truncatis, basiscopice modo excisis, deinde leviter lobatis lobis inconspicue dentatis, glabris, herbaceis, obscure viridibus; venis furcatis; soris margine et costa remotis.

MINDORO: Mindoro Oriental Province, Mabaho ridge, Mansalay, *Philip. Nat. Herb. 16692 M. D. Sulit*, December, 1952.

Similar in aspect to *A. excisum* Presl, broader, distinguished by less excised pinnæ, nowhere conspicuously dentate, the basiscopic margin of the larger pinnæ shallowly lobed.

POLYSTICHUM EDANIOI Copeland, sp. nov. **Plate 2.**

P. P. obtuso simile indusio glabro; paleis rhizomatis obscuris 1 cm longis; stipitibus usque ad 40 cm longis, paleis diversis

* Philip. Jour. Sci. 81 (1952) 1–47, *plates 1–26.*

ochroleucis vestitis; lamina aequilonga 15–20 cm lata, bipinnata, apice attenuata pinnis 2 cm latis, acutis, viridibus, pinnulis rhomboideis pluriaristatis; venis setiferis; indusiis peltatis, stramineis, glabris.

LUZON: Ilocos Norte Province, Mt. Quebrada, alt. 1,115 m, *Philip. Nat. Herb. 16601 Edaño* (type); *16599, 16602, 16603, 16604, 16605, 16606, 16608 G. E. Edaño;* Mt. Pico de Oro, *Philip. Nat. Herb. 16629 G. E. Edaño.*

CTENITIS LAXA Copeland, sp. nov.

C. mesodonti affinis major quadripinnatifida, rhizomate breve, paleis 12 mm longis acicularibus fuscis vestito; stipitibus congestis 55 cm longis, atrofuscis, nitidis; lamina 50 cm longa, deltoidea, perlaxa, fusca, glabra, rhachibus gracilibus, infra pinnulam ultimam dente decurrente acuto donata; soris parvis. LUZON: Ilocos Norte Province, *Bur. Sci. 7757 M. Ramos,* March, 1909, type; Mt. Quebrada, alt. 83 m and 1,115 m, *Philip. Nat. Herb. 16586, 16614 G. E. Edaño.*

STICHERUS PINNATUS Copeland, sp. nov. **Plate 3.**

S. parvus, rhizomate breve, paleis 2–3 mm longis linearibus caudato-attenuatis ferrugineis vestito, stipitibus confertis 5–7 cm longis, brunneis, fibrillis paucis vestitis; lamina usque ad 15 cm longa, 2 cm lata, pinnata, rhachi brunnea fibrillis ferrugineis vestita; pinnis 2 mm latis, patentibus, obtusis, proximis non confluentibus, integris, superne atrobrunneis, praecipue inferne fibrillosis; venis furcatis; soris medialibus, sporangiis plerumque 4.

LUZON: Albay Province, Mayon Volcano, alt. 433 m; *Philip. Nat. Herb. 17204 Mendoza.*

Nothing suggests that stipe or rachis is ever forked.

TECTARIA PERALATA Copeland, sp. nov. **Plate 4.**

T. stipite 45 cm alto, usque ad pedem rhachique ala utroque latere 7 mm lata ornatis; lamina aequilonga, ovata, bipinnatifida, segmento apicale coadunato; pinnis infimis alternis valde remotis, erecto-patentibus, pedibus elongatis alatis, deinde irregulariter pinnatifidis vel lobatis, segmentis ultimis majoribus caudatis, glabris, atroviridibus; soris secus costas seriatis, indusiis persistentibus.

LUZON: Apayao Subprovince, Mt. Magnus, alt. 500 m; *Philip. Nat. Herb. 17297 G. E. Edaño.*

Bizarre enough to suggest hybridity.

CYCLOSORUS DIMORPHUS Copeland, sp. nov. Plate 5.

C. frondis fertilis stipite 15–20 cm longo, pinnis vestigialibus ornato, pilis pallidis minutis vestito; stipitibus frondium sterilium congestis usque ad 4 cm longis, frondibus sterilibus 10 cm longis, 2 cm latis, acutis, lobatis lobis 4 mm latis obtusis, setis albis utroque facie ad venas, praecipue superne ad laminam sat dense setulosis; venis 1½ to 2½-paribus anastomosantibus; fronde fertile 15 cm longa, 1½ cm lata vel deorsum paulo latiore, deorsum pinnata pinnis sessilibus 8 mm latis rotundatis; soris medialibus, inferioribus elongatis nudis, superioribus orbicularibus.

LUZON: Apayao Subprovince, Mt. Magnus, alt. 833 m; *Philip. Nat. Herb. 17282 G. E. Edaño.*

Closely related species, but with uniform fronds, are *C. matutumensis* Copel. and *C. sessilipinnus* (*Dryopteris sessilipinna* Copel., Philip. Jour. Sci. 6 (1911) 145; *D. canlaonensis*). *C. urdanetensis* is similar but without vestigial pinnæ on the stipe.

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ILLUSTRATIONS

PLATE 1. *Asplenium subresectum* Copel., sp. nov.; type.
2. *Polystichum edanioi* Copel., sp. nov.; type.
3. *Sticherus pinnatus* Copel., sp. nov.; type.
4. *Tectaria peralata* Copel., sp. nov.; type.
5. *Cyclosorus dimorphus* Copel., sp. nov.; type.

Asplenium resectum Cpl.
FLORA OF THE PHILIPPINES
Asplenium subresectum Cpl. sp. nov.

PLATE 1.

PLATE 2.

centimeters
PHIL. NAT. HERB. 17294
FLORA OF THE PHILIPPINES
PHILIPPINE NATIONAL HERBARIUM
D. R. Mendoza
May-June 1953

PLATE 3.

PLATE 4.

PLATE 5.

THE MARINE FAUNA OF TAGANAK ISLAND, LARGEST OF THE TURTLE ISLANDS GROUP WITH NOTES ON THE ECOLOGY OF THE ANIMALS ENCOUNTERED

By Jose S. Domantay
Of the Bureau of Fisheries, Manila

ONE TEXT FIGURE

INTRODUCTION

Taganak Island, largest of the Turtle Islands group, is almost surrounded by coral reefs. The island is hilly with three peaks aligned on the major axis. The highest, 400 feet above sea level, is in the north central part of the island. The hill to the northeast is 310 feet high and the one to the southwest is 202 feet in elevation. There are no creeks or streams but it is very surprising that almost all the islands in the group have a very good supply of fresh water from surface-water wells. A well one meter and a half deep dug anywhere in the island from near the tide-mark up over the hill gives a very good fresh water supply. It looks as if this fresh water supply is due to accumulated rain water that seeped through the porous sandy soil and deposited underneath the ground just above the layer of brackish water in the form of a water bowl; but what is puzzling is its presence even up in the hill. It may be unbelievable but it is the actual fact. In most other islands of even bigger sizes there is not such a supply of accumulated rain water that can solve the problem of fresh water supply. The group of many islets in the Hundred Islands in the Lingayen Gulf of Luzon would make an ideal marine biological station if the bigger islands have only a supply of fresh water like that in the Turtle Islands group.

In general the coastline is almost regular without any indentation due to its small size, but there is a great difference in its topographical conditions. The eastern coastline is very rocky with large boulders of volcanic rocks; whereas the western part is sandy. The northern and southern coastlines are partly rocky and sandy. It is in the sandy regions above the tide-marks where the marine turtles spawn.

The extensive shoals and reefs surrounding the island vary in different places from purely sandy, sandy-grassy, sandy-rocky, rocky, rocky-coral to purely coral reefs.

THE SOUTHEASTERN REEFS AND SHOALS WITH THEIR FAUNA

The southeastern and eastern reefs are very extensive and barren and usually exposed during lowest tide. One can easily wade without any danger of encountering harmful creatures

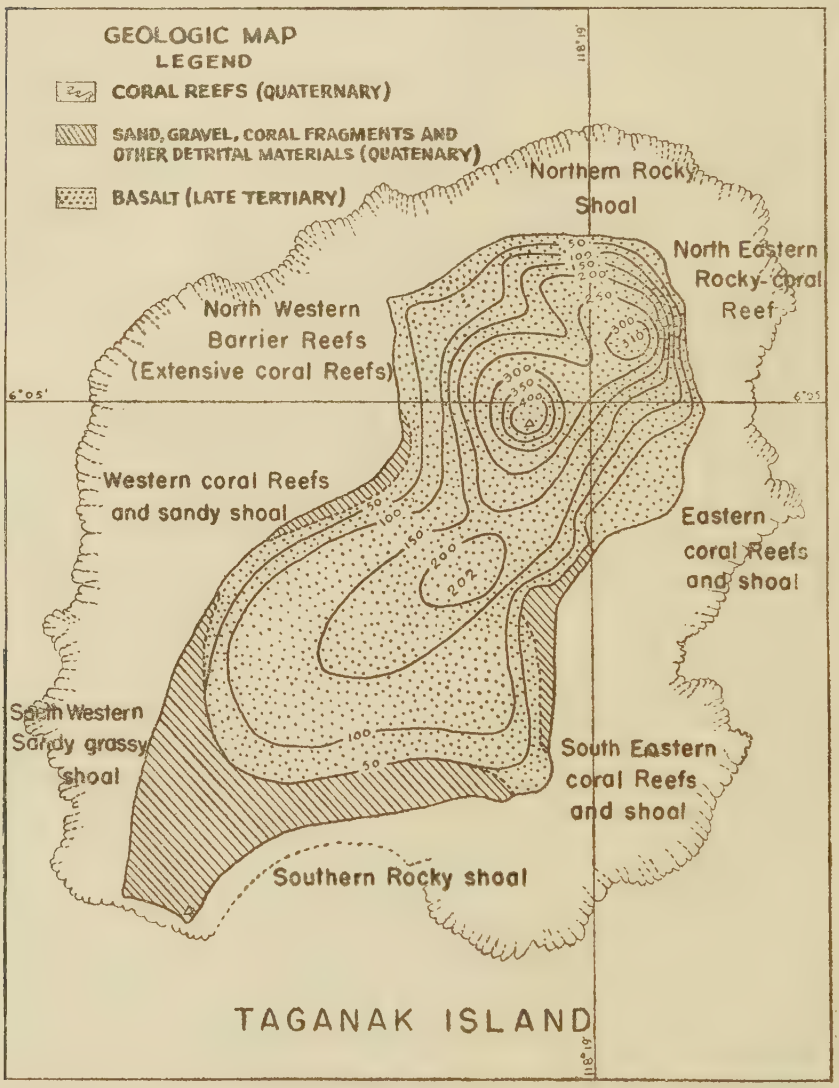

FIG. 1. Geologic map of Taganak Island showing the coral reef (quaternary) and the sand, gravel, coral fragments, and other detrital materials (quatenary) which are the collecting grounds of the different marine fauna during the lowest tide.

because the way is clear throughout. There were few spots of corals which were not luxurious in their growth and hardy bottom composed mostly of coral fragments. Among the echinoderms encountered in this region were few *Holothuria atra, H. argus, H. scabra, H. paradoxa* var. *aculeata, H. impatiens, Actinopyga miliaris, Synapta maculata, Opheodesoma spectabilis* var. *puerto galeræ,* and another one apparently a new variety, numerous *Linckia laevigata,* few *Nardoa tuberculata, N. frianti, Echinaster luzonicus, Oreaster nodosus,* and *Echinometra mathaei* var. *oblonga.* Among the coelenterates were species of *Sarcophyton, Sinularia, Litophyton, Lobophytum,* different species of sea anemones, a couple of *Clavularia,* a species of *Tubipora musica,* few species of *Xenia, Cespitularia,* and *Aglaophenia.* Among the sponges were numerous elephant ear (*Leiodermatium pfeifferæ*) and few other species. The most abundant forms were mollusks of different species, both commercial and non-commercial. Different species of giant clams like *Tridacna gigas, T. crocea, T. elongata,* etc., and *Hippopus maculatus* with their colorful mantles when their valves are open, were very conspicuous in the place. Bored at the massive coral rocks were the Serpulid worms *Pomatoceropis roxasi* with their beautiful variegated tentacles resembling colorful roses, and few *Terebella gracilibranchis* with their extended white threadlike tentacles over the hardy bottom ground. During the lowest tide when the southeastern coral reefs were exposed the deeper portion toward the shore formed a shallow lagoon which was rich in different species of *Sargassum* which constitute the food of the marine turtles. Few species of *Caulerpa* and other seaweeds were also found. This area was rather poor in marine animals. The *Terebella gracilibranchis* with its characteristic threadlike tentacles extended over the bottom was the only one noted, although there may be some other forms apparently hidden. Beyond this lagoon near the exposed barren area of coral fragments were numerous venomous sea urchins, the *Echinotrix calamaris* and *Centrechinus setosus.* The former is of different colors from the banded green spines to brown-purplish ones of large sizes.

Adjoining the area toward the shore was an extensive sandy-grassy flat where several echinoderms were noted, namely, *Holothuria atra, Holothuria vitiensis, Synapta maculata, Linckia lævigata, Echinotrix calamaris, Centrechinus setosus,* and few others. The most abundant was the *Linckia lævigata.*

Toward the southeastern and southern part is an extensive sandy shoal which is also exposed during the lowest tide. This is the landing place of most sailboats calling at the place. It is also an ideal bathing place of the island. In the shallower part toward the seashore were found *Holothuria marmorata, Archaster typicus,* small species of sea anemones, olive shells and several burying forms apparently worms and *Balanoglossus.* Along the shore were numerous dead shells cast apparently from the deeper part. Among the common ones were species of *Arca, Spondylus, Trochus, Tridacna, Hippopus, Malleus, Chama, Ostrea, Cyprea, Casis, Conus, Pterocera, Cardium, Neritina, Nerita, Acmae, Lutraria, Callista, Modiola, Dosinia, Pinna, Circe,* and few others. The barrenness of the reefs is apparently due to the continuous use of *tubli,* a poisonous substance used for catching fish by the natives.

THE SOUTHERN ROCKY POINT AND SOUTHWESTERN SANDY GRASSY SHOAL

The rocky point is very poor in marine life, practically barren. The most common forms noted were the *Holothuria atra* and *Linckia lævigata.* Among the rock crevices were few *Echinometra mathæi* var. *oblongata.* Few mollusks mostly small gastropods and rock borers too, from the appearance of some of the rocks, were found.

The small coral reef adjoining this rocky point had similar echinoderm fauna. Aside from the said echinoderms were noted few stony and soft corals, the latter composed of species of *Sarcophyton* and *Lobophytum.* A shallow-water variety of elephant ear sponge, the *Leiodermatium pfeiferæ* (Carter) was abundant in this reef.

Beyond the rocky point toward the southwestern part is an extensive sandy grassy shoal which had a richer marine fauna. The dominant forms in this shoal were the echinoderms. There was practically only one species of sea cucumber, namely, the *Holothuria atra* which was found by the thousands. The place was dotted with this particular species, so that if one ever collects it, a banca can be easily filled up within a few minutes. It is in this place where the writer encountered one very rare specimen showing external budding in a holothurian (*Holothuria atra*). Next in abundance was the blue starfish, *Linckia lævigata* and the venomous sea urchins, the *Echinotrix calamaris,* and *Centrechinus setosus.* Most of the latter echino-

derms were found exposed over the shallow grassy bottom, usually in groups. Sparse coral rocks were found, and in their crevices were found the *Echinometra mathæi* var. *oblonga.* A starfish, *Nardoa frianti,* was encountered in this place together with *Ophiocoma scolopendrina,* a brittle star.

Among the other marine fauna in this shoal were few stony and soft corals and few species of sea anemones. The annelid *Terebella gracilibranchis* with its striking threadlike tentacles which extend over the shallow bottom was one that could not be overlooked. The mollusks although many of them might have been overlooked were represented by many of their shells cast ashore, namely, few species of *Arca, Spondylus, Chama, Cardium, Conus, Trochus, Cyprea,* and cuttlebones.

WESTERN AND NORTHWESTERN SHOALS AND CORAL REEFS

The western area is composed of extensive sandy grassy shoal with few spots of corals and some rocky portion. The marine fauna of this shoal is identical with that of the southwestern sandy grassy flat. In addition however, were noted many *Archaster typicus,* many of them copulating in the shallower portion toward the seashore.

The northwestern part is a very extensive barrier reefs mostly exposed during the lowest tide. The physical condition of this part is very different from that of the southeastern reefs and though generally poor in marine life due to the continuous use of the poisonous *tubli* in fishing by the natives, it is still richer than the other reefs already described. The presence of many small atolls in this region scattered over the extensive barrier reefs seems to prove that the land formation in Taganak is still in progress.

The stony and soft corals in this area are generally large and massive, very different from those of the southeastern reefs. The soft corals represented by *Sarcophyton, Sinularia,* and *Lobophytum* of different species are generally giant-sized occupying extensive area, and were the dominant forms of marine life in the place. Large colonies of *Clavularia, Tubipora musica, Capnella, Anthelia, Xenia, Cespitularia, Alcyonium, Litophyton,* and other alcyonarians were found sporadically all over the place. Many of the stony corals were worn out and were in the process of disintegration, contributing to the thick layer of coral fragments at the bottom. This may be a conclusive evidence that part of the Taganak Island is

still in the process of formation. Among the stony corals were different species of *Acropora, Porites, Pocillapora, Stylophora, Montipora, Galaxea, Polyphyllia, Fungia, Halomitra, Seriatopora, Mussa, Favia,* and many others.

The marine life of this extensive barrier reef though richer than the southeastern reefs is still very poor compared with many other reefs the writer had explored in some other parts of the Philippine Archipelago. Among the echinoderm fauna, the *Linckia lævigata* was the most predominant form. The absence of the *Holothuria atra* which was the most dominant form in the southwestern and western sandy grassy shoals was very conspicuous in this area. Other echinoderms found were two varieties of *Gulcita movoguineæ,* namely, *C. novoguinea* var. *typica* and *C. novoguinea* var. *plana, Nardoa tuberculata, N. frianti, Hippasteria philippinensis,* a new species of starfish; *Holothuria gyrifer, H. vitiensis, H. pulla, H. scabra, H. marmorata, H. argus, H. pardalis, Synapta maculata, Echinometra mathæi* var. *oblonga, Echinotrix calamaris, Centrechinus setosus,* and *Echinaster luzonicus.* Among the brittle stare were the *Ophiomastix annulosa, O. lutkeni, Ophioplocus imbricatus, Macrophiotrix longipeda, Ophiartum elegans, O. pictum, Ophiocoma scolopendrina* var. *Schoenleinni, Ophiolepis superba O. cincta,* and *Ophiarachnella infernalis.*

The other group of animals found in the place were represented by several species of sponges of the genera *Leiodermatum, Spirastrella, Euspongia, Spongelia,* etc.; few species of large sea anemones of the genera *Actinia, Gonactinia,* etc.; several species of sea slugs, one of which was the *Dolabella;* few species of Nudibranchs, numerous species of *Cyprea, Pterocera, Neritina, Nerita, Acmæa,* and many other gastropods. Several species of giant clams represented by *Tridacna gigas, T. squanmosa, T. serrifera, T. elongata, T. crocea,* and *Hippopus maculatus,* were abundant. Other lammellibranchs were species of *Spondylus, Arca, Cardium, Lutraria, Callista, Modiola, Dosinia, Pinna, Circe,* etc. Cuttlefish and other cephalopods were also found. The massive coral rocks were littered with serpulid worms of the species of *Pomatoceropsis roxasi,* and at the bottom were found numerous *Terebella gracilibranchis* with their characteristic threadlike tentacles extended outward over the surface. Among the crustaceans were many species of crabs, prawns, sea mantis, and other forms not collected and determined. Many of them were similar to those found in Zamboanga reefs which are undetermined.

It was expected that inside the coral rock crevices and underneath the massive soft and stony corals were other forms of marine life which were hiding during the time when the entire reefs were almost exposed. When these reefs were under water, one had to be very careful in wading unlike in the southern reefs which the writer had explored previously. In general, the northwestern reefs were richer in marine life than the southeastern ones.

In some distant future this great barrier reef of Taganak Island may become a part of the mainland. At the southwestern and southern side of the island were extensive piles of fine, white sand already forming part of the mainland which sooner or later may become arable. Part of this added area was already covered with vegetation.

The coastal part of the northwestern and western great barrier reefs revealed some other forms of marine life, some of which were already encountered in the reefs, such as *Holothuria pulla,* a sea cucumber; *Oreaster nodosus,* a starfish; *Ophiocoma scolopendrina,* a brittle star and few spots of alcyonarians of the genus *Cespitularia;* a carpet of *Clavularia; Euspongia oficinalis,* a species of commercial sponge; and few other species of non-commercial sponge. Many copulating *Archaster typicus* and *A. angulatus,* small starfishes, were also noted. *Cyprea moneta* and few other species were abundant. Numerous small species of *Pinna* were also encountered. Among the small boulders of rock were small species of *Ostrea* and mussels.

THE NORTHERN AND NORTHEASTERN SHOALS

The northern and northwestern shoals were apparently poor in marine life as they were covered mostly with extensive seaweeds of the genus *Sargassum.* A similar shoal covered with *Sargassum* in the southern reefs revealed a very poor marine life. Wading in this forest of *Sargassum* was rather dangerous, because one could not see clearly the bottom so the survey was confined to the coastal area mostly.

The tidal area in this region was characterized by numerous large boulders of volcanic rocks. Among these rocks were attached small species of *Ostrea,* mussels, rock barnacles, limpets, gastropods, and an extensive carpet of *Clavularia viridis* which seemed to be the most dominant form. Few *Holothuria atra, Linckia lævigata,* and *Echinaster luzonicus* were also encountered.

The shoals may reveal more forms of marine life, if extensively surveyed. Some harmful creatures like poisonous marine snakes are likely to be encountered in this area. The entire place serves as the feeding habitat of the marine turtles.

THE EASTERN SHOAL

The eastern area was similar to the northeastern side with large boulders of volcanic rocks, and was rather poor in marine life. The *Sargassum* forest was not too thick and allowed one to wade through it. The bottom was carpeted with low stumpy brittle corals with their branches uniformly packed together directed upward terminating in one particular plane, apparently a hydrocoral. Wading over this carpet of brittle corals was very difficult because it gave way burying the feet usually up to the ankle. Scattered spots of stony corals were found here and there with the carpet of brittle corals around them. The predominant marine life in this region besides the brittle corals which formed the flooring of the sea-bottom was *Clavularia viridis,* already encountered in the other regions.

Among the echinoderms found in this place were *Linckia lævigata, Echinotrix calamaris,* and *Echinometra mathaei.* Few other forms may be revealed if extensively surveyed. In general the place was barren and very poor in marine life.

REEFS FOUND IN THE DEEPER WATERS

In general the deeper reefs around the island were rich in marine life. The deeper reefs from seven to fifteen fathoms around the eastern and southeastern part of the island apparently were not affected by the poisonous *tubli* used for a long time in the shallower reefs by the natives for catching fish, and showed luxuriant growth of marine life. With a water glass or telescope during sunny days, one could see the different fauna of the deeper place. Among the luxurious stony corals of different species were seen alcyonarians growing luxuriously the *Plexaura roxasi, Isis reticulata, Xenia, Anthelia, Capnella, Cespitularia, Sarcophyton, Litophyton, Lobophytum, Sinularia,* etc. Among the hydroids, the *Aglaophenia* grew in enormous colony. Intermixed with all these colorful marine fauna were other groups like the crinoids, the serpulids, tunicates, etc., which gave the beautiful sight of a submarine garden. Different species of colorful fishes, marine turtles and other moving creatures, the beautiful mantles of

giant clams, different colors of large sea anemones and sponges added to the beauty and grandeur of the submarine garden.

Among some of the moving creatures that were seen through the water glass or telescope were large holothurians, the *Thelenota ananas, Stichopus chloronotus, Holothuria vitiensis, Holothuria argus,* the large blue starfish *Linckia lævigata,* and several colorful crinoids or sea lilies. Two species of marine turtles, the *Chelonia mydas* and the *Eretomchelys imbricata,* were also seen gliding over the picturesque submarine garden. Among the large fishes that were caught from the deeper reef were different species of *Epinephelus, Caranx, Scomberoides, Lutianus, Caesio, Lethrinus, Acanthurus, Platycephalus, Scarus, Upeneus, Priacanthus,* and *Sphyraena.* Those that were seen in big school were the *Caesios.* Some of the fishes caught by the fishermen who were with the writer when the survey was made were not permanent dwellers of the reefs but apparently transient, namely, the *Caranx, Scomberoides,* and the *Sphyraena.* Through the water telescope many smaller species of fish with beautiful colors were also seen, some of them being species of *Chaerodon, Cheilinus, Gobies, Scarus, Argyrops, Plectorhinchus, Pomacentrids,* small species of *Caesio,* and others not fully recognizable.

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ENTAMŒBA DILIMANI SP. NOV. FROM PHILIPPINE GOATS

By Glenn A. Noble
Fulbright Professor, University of the Philippines

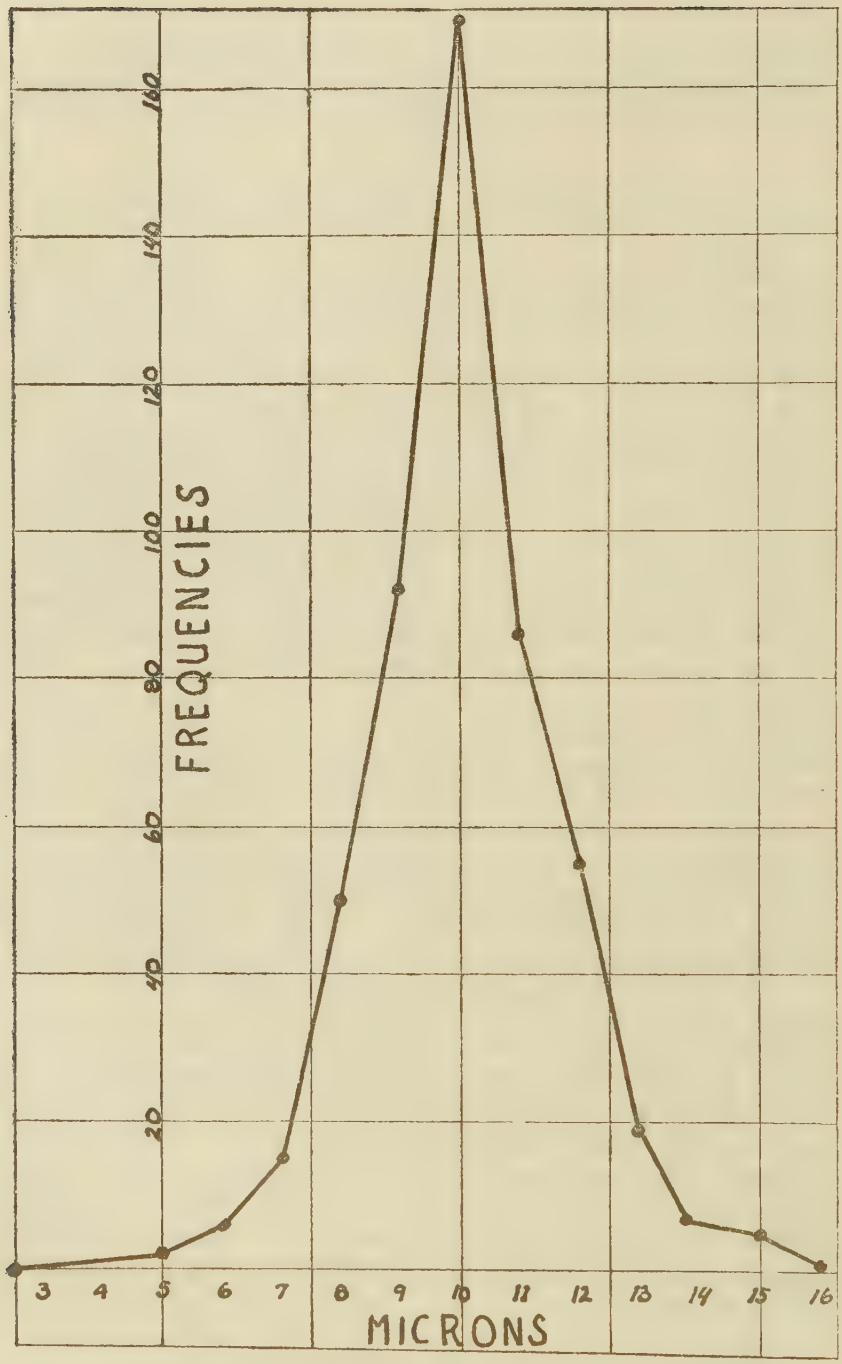
ONE PLATE AND ONE TEXT FIGURE

Intestinal amœbæ in goats have been studied by few investigators. Nieschulz (1923) found, in a goat, a species of *Entamœba* which he considers to be the same as *E. debliecki* from the pig. Fantham (1923) described a large trophozoite form of *E. capræ* from the intestine of a goat and from the stomach of a sheep. Wenyon (1926) found an *E. coli* type in the goat. Galli-Valerio (1935) named this amœba *E. wenyoni.* Noble and Noble (1952) summarized the literature on amœbæ of domestic animals and have compared specimens from several countries. Their goat forms were all from the United States. They concluded that the amœbæ from this host all belonged to one species since there appeared fine gradations between all the various forms. This species they called *E. polecki* (Prowazek).

During the academic year 1953 to 1954 the author repeatedly examined a group of twelve goats on the campus of the University of the Philippines, Quezon City. All animals harbored intestinal amœbæ. The number of amœbæ in any goat fluctuated greatly. One day there would be hundreds of cysts in a single unconcentrated smear while on the next day diligent search was necessary to find one. There was no evidence of pathogenecity, but no special study was made of this possibility.

METHODS AND MATERIALS

Fresh smears were made at random intervals over a period of six months. The material was studied immediately in an effort to locate motile forms. Both a standard microscope and one with phase contrast attachments were used for this purpose. Glycogen vacuoles were investigated with iodine stain, and permanent mounts were made using Schaudinn's fixative and Heidenhain's iron hematoxylin staining technique. Camera lucida sketches were made, upon which were based all drawings.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MICRONS

FIG A

OBSERVATIONS

Two motile forms were found in the hematoxylin-stained preparations (Plate 1, figs. 14, 15). They both measured about 12 microns across the maximum length. Their cytoplasm contained vacuoles surrounding bacteria. Each individual had thrust out broad, rounded pseudopodia whose ends showed a fairly clear ectoplasm. In most other respects the motile forms resembled the cysts described below. The two illustrations of the motile forms are drawn at a somewhat smaller scale than the surrounding cysts.

Cysts averaged 9.66 microns in diameter. A measurement of 510 individuals presented a histogram (Fig. A) which indicated a single species. A typical cyst contained a single nucleus which averaged 3 microns in diameter. Peripheral chromatin was often lacking (Plate 1, figs. 9, 10). In many nuclei this material appeared as large, irregular granules, few in number (Plate 1, figs. 1, 3, 7, 13). The endosome was regularly a small, central dot (Plate 1, figs. 4, 8). Rarely the endosome was eccentric (Plate 1, fig. 18). The entire nucleus was filled with fine granules. In some individuals these granules were densely packed within an endosomal ring (Plate 1, figs. 3, 13); while in others they were denser outside this ring (Plate 1, figs. 2, 9, 18). In a few individuals the ring seemed to be lacking (Plate 1, figs. 8, 10, 17). Out of about two thousand cysts, two contained two nuclei (Plate 1, figs. 11, 12). In one cyst the nucleus was dividing (Plate 1, fig. 19). The cytoplasm usually contained one or more large vacuoles. With iodine solution these vacuoles gradually became reddish-brown indicating glycogen. Before complete staining, the vacuoles often appeared doughnut-shaped (Plate 1, fig. 5). Others were extremely irregular (Plate 1, fig. 6). Fixation seemed to cause the vacuoles to become rounded. Chromatoidal bodies varied in number from a crowded condition (Plate 1, fig. 3) to none (Plate 1, fig. 18). They ranged from small irregular masses (Plate 1, fig. 8) to a single, large sausage-shaped structure (Plate 1, fig. 4). The cytoplasm consisted of either coarse granules (Plate 1, figs. 1, 4, 19) or fine particles (Plate 1, figs. 7, 18). In some individuals there were scattered dots instead of identifiable chromatoidal bodies (Plate 1, fig. 17).

DISCUSSION AND CONCLUSIONS

Entamœba policki in United States goats is characterized as follows: Cysts average 6.42 microns; nucleus frequently surrounded by a clear area; no binucleate forms; peripheral chromatin usually consists of numerous, conspicuous granules; endosome consists of a few, closely-grouped granules often appearing as a large dot; periendosomal ring rarely present.

The goat amœbæ from the University of the Philippines campus are characterized as follows: Cysts averaged 9.66 microns; nucleus not surrounded by a clear area; binucleate cysts present, although rare; peripheral chromatin rarely forms a heavy ring, usually it consists of a single small dot; periendosomal ring usually present. For these reasons this amœba is named *Entamœba dilimani* sp. nov.

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ILLUSTRATIONS

[All figures were made with the aid of a camera lucida. The one-micron scale mark drawn near figure 6 is applicable to all figures except figures 14 and 15 which are reduced in comparative size.]

PLATE 1

FIG. 1. Typical cyst with periendosomal ring but without chromatoidal bodies.
2. Cyst with light periendosomal area.
3. Cyst with slightly elliptical nucleus, periendosomal area dark.
4. Cyst with single, large chromatoidal body.
5. Cyst stained with iodine showing glycogen vacuole with unstained center.
6. Cyst stained with iodine solution showing irregular glycogen vacuole.
7. Non-vacuolated cyst. Nucleus with large dots of peripheral chromatin.
8. Cyst without periendosome, with two glycogen vacuoles.
9. Cyst with many chromatoidal bodies and two large vacuoles.
10. Cyst without chromatoidals, without periendosome but with large vacuole.
11. Cyst with two nuclei.
12. Cyst with two nuclei.
13. Cyst with elliptical nucleus containing large, scattered peripheral dots.
14. Motile form (trophozoite).
15. Motile form showing pseudopods.
16. Cyst with large elliptical nucleus.
17. Cyst whose nucleus seems to lie within the vacuole.
18. Cyst with homogeneous cytoplasm and eccentric endosome.
19. Cyst whose nucleus is dividing.
20. Cyst with eccentric endosome but no peripheral chromatin.

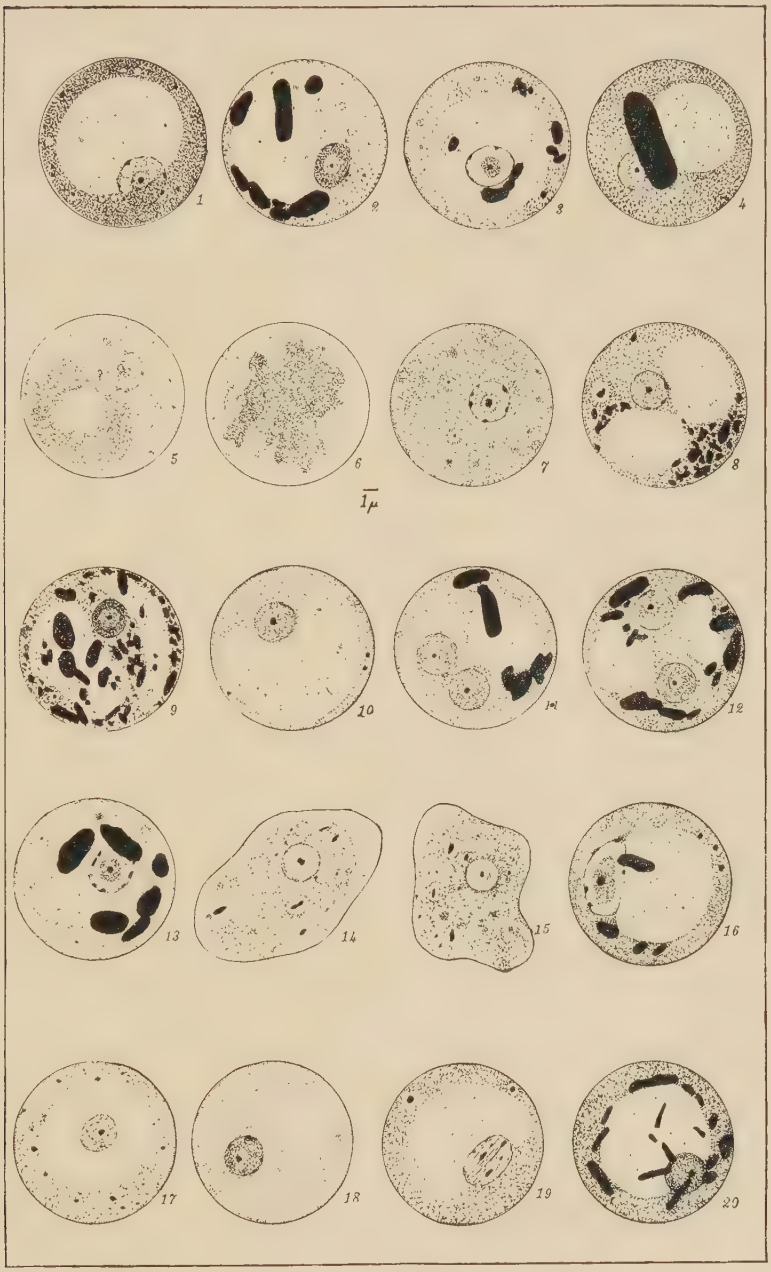

PLATE 1.

THE OCCURRENCE OF A NYMPHAL LINGUATULID (ARTHROPODA: PENTASTOMIDA) IN THE LUNGS OF THE DOMESTIC CAT *

By L. M. Yutuc
Of the College of Veterinary Medicine, University of the Philippines, Quezon City

ONE PLATE

The present immature linguatulid was presented to me by Mr. Narciso V. Villarta, a former thesis student of the Department of Veterinary Medicine and Surgery, College of Veterinary Medicine, University of the Philippines, Quezon City. It was recovered from a cyst under the pleura of the lungs of a native cat. At first, it was thought to be a gnathostome, a common helminth of the cat. However, on microscopic examination its true nature was revealed. Under fresh condition it showed sluggish movements.

Sambon (1922) recorded the nymph from various hosts, namely, man, two species of monkey, tiger, leopard, Indian civet cat, domestic dog, and Indian otter (p. 202). Tubangui (1924) described this nymphal linguatulid recovered from the omentum of a palm civet cat in the Philippines along with the adult, *Armillifer moniliformis* var. *heymonsi* Sambon, 1922. While the adult is found in reticulated python, *Python reticulatus,* in the Islands, in India, Malaya, and Java, *Python molurus.* Faust (1927) described briefly a single immature specimen obtained from the liver of a Tibetian in China who died from millary tuberculosis.

A survey of available literature disclosed that the nymph of this linguatulid has not been fully described and that no report has been made about its occurrence in the domestic cat; hence the present note seems desirable.

Description.—The nymph is cylindrical in shape, whitish in color and measured 7.5 by 1.5 mm. It is roughly divisible into an anterior unsegmented and a posterior segmented portions (Plate 1, figs. 1 and 2). The anterior unsegmented portion probably corresponds to the cephalo-thorax of the adult

* Paper read in the twenty-eight annual meeting, American Society of Parasitologists, Wisconsin University, September 8, 1953; *Abstract* in Jour. Parasit. § 2 39 (1953) 29–30.

arthropod; measures 0.85 by 1.20 mm (Plate 1, fig. 1). It is blunt and bears the mouth, which is almost circular on its ventral aspect. It measures 0.14 by 0.15 mm. On its sides of the mouth are two almost equal hooks, each of which are provided with a curved chitinous process and a pair of rather long roots implanted into the corresponding hook pit (Plate 1, figs. 3 and 4). The posterior segmented portion is comparatively long, 6.65 by 1.5 mm with 28 segments. The segments are generally wider and shortest anteriorly, but become widest at about the middle of the body with the increase in length. On the other hand, the length of the segments increases progressively towards the posterior end of the nymph with a decrease in the width, the narrowest being the last segment. The posterior end is cone-shaped. On the last segment and ventrally, the vulva is located, a short distance anterior to the anus, the latter being terminal (Plate 1, fig. 2). The cuticle is ornated with minute nodules. The above description is based on a single specimen.

Comment.—In general, the above described nymph bears a close resemblance with the one described by Tubangui (1924). Since no mention was made about the sex, it appears that the present nymph is more advance in development. In Faust's nymph, the integument is provided with spines, whereas in the present larva, the cuticle is ornated with fine minute nodules. Herzog and Hare (1907) reported the nymph of *Porocephalus constrictus* in a native Filipino. It was recovered from a cyst of the liver. According to Sambon, it belongs undoubtedly to the nymphal form of the Oriental species, *Armillifer monilliformis* (p. 390). The present specimen, therefore, constitutes the third nymph reported from the Philippines, and the first from the domestic cat.

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ILLUSTRATIONS

[Abbreviations: *A*, anus; *H*, hook; *M*, mouth; and *V*, vulva.]

PLATE 1

FIG. 1. Anterior ventral portion of the nymph showing the hooks and mouth.
2. Posterior ventral segment of the nymph showing the anus and vulva.
3. One of the first pair of hooks.
4. One of the second pair of hooks.

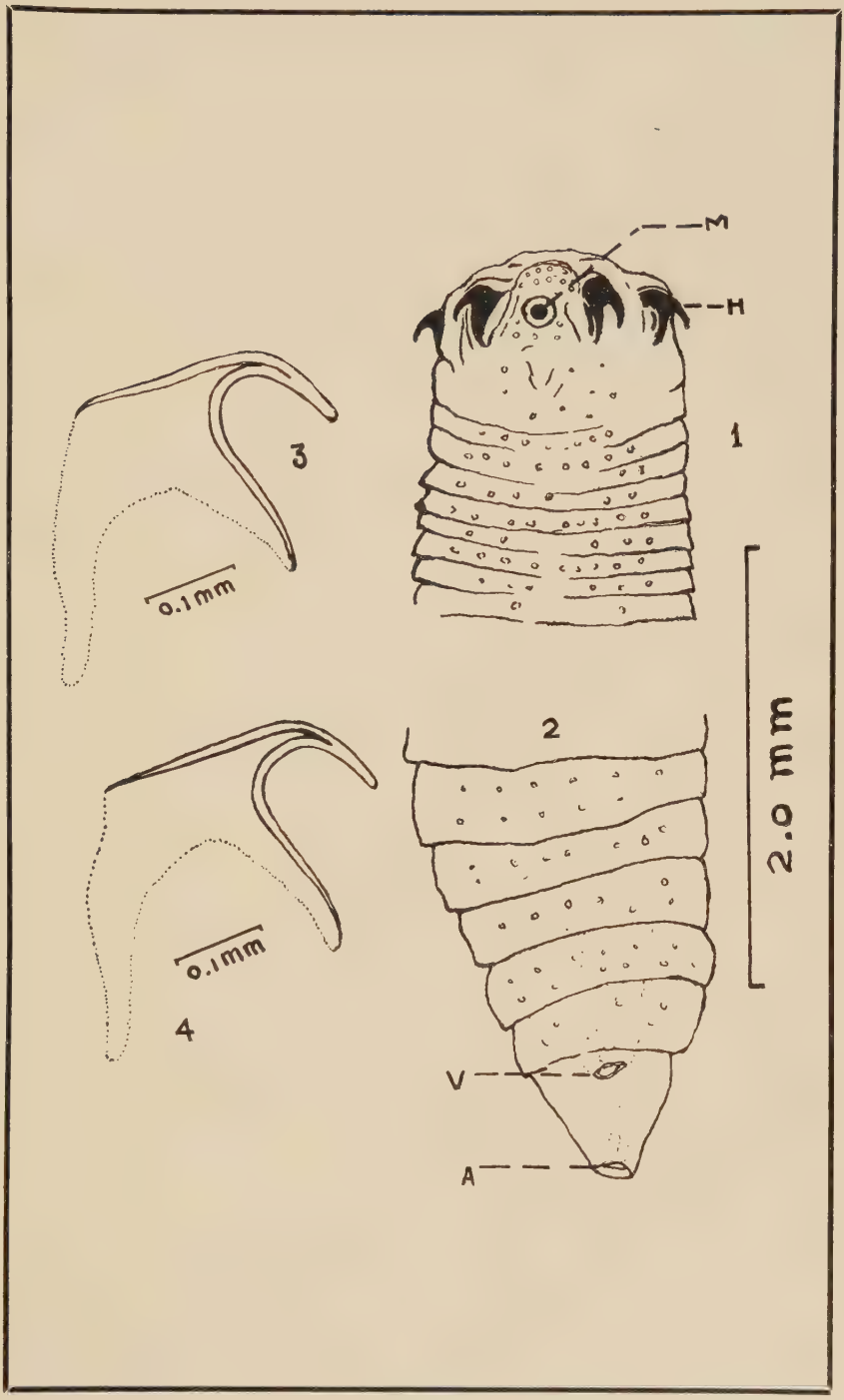

PLATE 1.

NOTES ON ARADIDÆ FROM THE EASTERN HEMISPHERE (HEMIPTERA), II

ARADIDÆ FROM THE ORIENTAL AND AUSTRALIAN REGIONS IN THE HUNGARIAN NATIONAL MUSEUM, BUDAPEST, HUNGARY, I

By Nicolas A. Kormilev
Of Buenos Aires, Argentina

FIVE TEXT FIGURES

Through the good office of Dr. Eva Halaszfy, I had the privilege to study the unidentified specimens of Aradidæ deposited in the collections of the Hungarian National Museum in Budapest. I wish to express my gratitude to her. I am also indebted to my friend, Mr. Carlos A. Wappers, the artist of the Instituto Nacional de Investigaciones de Ciencias Naturales, Buenos Aires, for the excellent drawings.

MEZIRINAE Oshanin

CALISINI (Stål)

CALISIUS Stål, 1860

1. CALISIUS ANNULICORNIS Bergroth, 1913.

Calisius annulicornis Bergroth, Can. Ent. 45 (1913) 9.

One male, Australia, Victoria, Alexandra + (ex coll. Brancsik).

This is the first record of this species from the Australian continent. It was described from Tasmania.

CARVENTINI Usinger

CARBENTUS Stål, 1865

2. CARVENTUS HORVATHI sp. nov..

Male.—Elongate-ovate, flat, widening posteriorly to fifth abdominal segment, thence narrowing caudad; yellow-brown, tibiæ and tarsi slightly paler; abdominal tergites bright yellow and smooth, with two longitudinal rows of big, round, bright, testaceous spots, blended together in each row, and densely covered with a coarse punctation; a small, smooth, round stain of the same color in the middle of each spot. Body largely covered with a dense, whitish incrustation; first antennal joints and femora less densely covered; remaining antennal joints, tibiæ, and tarsi naked.

Head subquadrate, scarcely longer than wide across eyes (15:14), somewhat narrowing toward the apex; jugæ long, slender, contiguous, slightly notched anteriorly, reaching to two-thirds of first antennal joint; clypeus short, slender, reaching to one-third of first antennal joint; antenniferous tubercles dentiform, slender, subparallel, reaching to apex of clypeus. Eyes semi-globose, whitish. Postocular spines stout, dentiform, projecting far beyond outer margin of eyes; postocular border carinated, slightly concave, strongly convergent, separated from disk by a narrow sulcus; vertex with two (1 + 1) elongate, infraocular callosities; bucculæ produced anteriorly and contiguous forming a rostral groove posteriorly; rostrum placed in groove and reaching its posterior margin. Antennæ almost twice as long as head (28.5:15); segment I stout, clavate, the others slender, IV pyriform, and with long white bristles apically; proportions of antennal joints I to IV, 8:4.5:9:7.

Pronotum wider than long (29:18), separated into two lobes; collum prominent, distinctly separated from disk, fore border on each side of collum deeply notched, there provided with a big globbose tubercle, thence expanded into flat, rounded antero-lateral lobe; lateral border of pronotum triply notched; first notch deep and rounded (fore lobe); second also deep, but angular, placed behind transverse depression; third shallow and placed near postero-lateral angle of hind lobe; a stout, dentiform, process, directed outwards between first and second notches; lateral border salient and rounded between second and third notches. Fore disk with a slender median sulcus crossed by another slender, curved sulcus, which runs between anterior (ultra-collar) notches; two (1 + 1) oblique callosities, and more outwardly two (1 + 1) oblique carinæ behind this transverse sulcus; a small tubercle in middle of transverse depression. Hind disk with a stout transverse elevation, running between humerous; both disks are covered with disperse granulation,

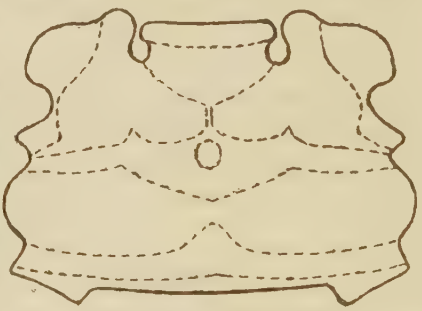

FIG. 1. *Carventus horvathi* sp. nov. pronotum, ♂.

which is absent on collum; callosities of fore lobe and on anterior margin of hind lobe (Fig. 1).

Scutellum wider than long (17:11), flat, with a low, granular, median ridge; lateral borders slightly convex, apical angle obtuse.

Hemelytra membranous, white, transversely rugose, and with a brown, round, spot near middle of outer margin; veins indistinct; coriaceous portion reduced to short lateral ridge on base of exterior border; clavus indistinct. Hemelytra reaching elevated fore border of seventh abdominal tergite; entire connexivum exposed.

Abdomen longer than wide (49:39)[1]; segments of connexivum finely granular; and with two callus spots near interior margin; postero-lateral angles of segments II to IV slightly produced beyond border of subsequent segment, those of V and the VI slightly more so, those of VII dentiform, directed backwards and slightly divergent. Spiracles very small, all but that of II placed laterally and visible from above. Lobes of VIII (male) spearhead-shaped with spiracle lateral; hypopygium conical rounded apically, as long as wide (7.7), slightly longer than lobes of VIII.

Male.—Total length, 5.5 mm; width of pronotum, 1.8 mm; width of abdomen, 2.4 mm.

Holotype.—Male. New Guinea, Huon Gulf, Sattelberg, 1899 (*Biró*). Deposited in the Hungarian National Museum in Budapest.

This species is dedicated to the late Dr. Geza Horvath, the eminent Hungarian hemipterologist and ex-director of the Museum.

The new species is allied to *C. ståli* Bergroth, but differs from it and other species by the shape of pronotum and other characters.

3. CARVENTUS BIROI sp. nov.

Male.—Smaller, less elongate and less flat than preceding species; brown; tibiæ and tarsi yellow; abdominal tergites uni-

[1] The length of the abdomen in this and the following species is measured for convenience from the apex of the scutellum to the tip of the ninth abdominal segment.

formly brown, round spots formed only by punctation; mostly covered with whitish incrustation.

Head slightly wider across eyes than long (13:12); judæ stout, anteriorly hyalescent, reaching to two-thirds of the first antennal joint; clypeus slender, reaches to one-third of first antennal joint; antenniferous spines stout, dentiform, divergent, as long as the clypeus; postocular spines stout, dentiform, distinctly projecting beyond outer margin of eyes; postocular border concave, strongly convergent; vertex with three longitudinal carinæ, median stouter and higher; proportions of antennal joint I to IV; male 9:6:9:9; female 10:6:10:10.5. Rostrum reaching apex of rostral groove, the latter not reaching base of head.

Pronotum wider than long (25:15), divided into two lobes; fore lobe with a prominent collum, with a deep, narrow notch lateral to latter, antero-lateral angles produced into inflated subangular lobes; anterior border of this lobe obliquely truncate and scarcely sinuate in middle; lateral border of pronotum triply notched; first notch in middle of fore lobe, wide and deep; second notch at level of transverse depression, narrow and deep; third notch on postero-lateral angle, small and shallow; hind border straight in middle and triangularly produced on each side of scutellum; fore disk with a small cross-shaped tubercle near middle of collum; another median tubercle in middle of transverse depression; a tiny median sulcus between them; two obliterated callosities lateral of median sulcus and two (1 + 1) oblique ridges more outwardly, at base of the antero-lateral lobes; hind lobe transversely elevated; elevation interrupted in middle; anterior border of hind lobe declivous and with two (1 + 1) callous, reddish-brown depressions at each side of the median tubercle; with a transversal sulcus posteriorly along the hind margin (Fig. 2).

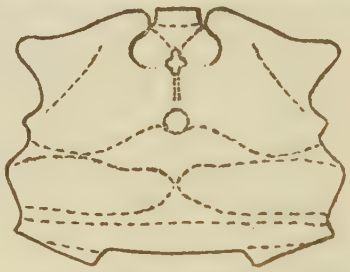

FIG. 2. *Carventus biroi* sp. nov., pronotum, ♂.

Scutellum wider than long (13:7) lateral borders slightly rounded angularly rounded; median ridge widening forward; crescent-shaped callous depressions on each side of latter.

Hemelytra reaching fore border of seventh abdominal tergite (male); coriaceous portion truncate apically, reaching middle of scutellum; baso-lateral border carinate; membrane hyaline, pale-ocraceous, with a big, round, brown spot near middle of outer margin; veins indistinct; connexivum entirely exposed.

Abdomen longer than wide (35:30); lateral borders widening to segment V, thence narrowed posteriorly; postero-lateral angles II to V slightly prominent, more prominent on VI, angularly produced and directed backwards on the VII; spiracle of II ventral, the others lateral and visible from above; lobes of VIII (male) spearhead-shaped, reaching apex of VII; hypopygium is small, pyriform, with a tubercle on median ridge near front border.

Female similar to male, but abdomen more rounded; postero-lateral angles of the abdominal segments VI and VII less prominent; lobes of VIII small, triangular, reaching apex of VII; oviduct slightly longer than genital valves.

Total length: male, 4.38 mm; female, 4.75 mm; width of pronotum: male, 1.56 mm; female, 1.69 mm; width of abdomen: male, 1.87 mm; female, 2.25 mm.

Holotype.—Male. New Guinea, Astrolabe Bay, 1897 (*Stephensort-Biró*), deposited in the Hungarian National Museum in Budapest.

Allotype.—Female. New Guinea, Huon Gulf, 1898, (*Simbang-Biró*), in the same collection.

Paratype.—Male and female. New Guinea, Astrolabe Bay, *Erima-Biró* coll., 1896, deposited in the collection of the author.

This species is dedicated to late Mr. Biró, who collected extraordinary entomological material, mostly in New Guinea.

The new species is allied to *C. gestroi* Bergroth, but differs from it by the smaller size, by slightly transverse head, slightly longer antennæ, segment IV is particularly longer, as long as or longer than III; by the fore lobe of the pronotum which bears a cross-shaped tubercle, and other details.

CAMERARIUS Distant, 1902

4. CAMERARIUS WAPPERSI sp. nov.

Male.—Yellow-brown; tibiæ slightly paler; heavily clothed with a white, calciform incrustation, covering almost the entire body; free of incrustation are: rostrum, antennæ, six curved callosities on fore lobe of pronotum, abdominal tergites, two round spots on each segment of connexivum from IV to VII, abdominal spiracles, part of acetabulæ, legs, and six longitudinal rows of round callous spots on vender (Fig. 3).

Head longer than wide across eyes (15:12.5); clypeus short, reaching to one-fifth of first antennal joint; the jugæ stouter, and longer, parallel, hyalescent, reach to two-thirds of first antennal joint; antenniferous spines long, dentiform, exteriorly parallel basally separated from the eyes by a narrow but deep notch, reaching to one-half of the first antennal joint. Eyes relatively small, semiglobose whitish; postocular spines stout, projecting far beyond outer margin of eyes, exteriorly with an outwardly directed tubercle; their posterior border slightly sinuous. Antennæ slender and short, one and one-half times as long as head; segment I stout, dilated at two-thirds of its length, apically rounded; II slender, slightly widening toward apex; III the slenderest, basally petiolated; IV fusiform, with a brush of white bristles on apical half. Proportions of the antennal joints (I to IV): 6.5: 5: 7: 4.5. Rostrum short and placed in rostral groove, not reaching hind border of latter; rostral groove posteriorly reaching slightly over middle of head.

Pronotum wider than long (31 : 20), separated into two lobes; transverse, interlobal sulcus fine and twice curved, distinct only on disk; fore lobe with a distinct, prominent collum, which is provided laterally on each side with a tubercle and separated from the antero-lateral lobe by a deep notch; antero-lateral lobe each with three teeth; interior curved, directed forwards and then outwards; median, the stoutest and longest directed obliquely outwards; exterior, the shortest, directed outwards; in the interlobal notch a stout, long tooth, directed outwards (maximal width of pronotum); fore disk with 6 (3 + 3) longitudinal, curved, callous spots; hind lobe transversely elevated and declivous forwards and backwards; humera tumidly elevated and granulated; between them a transverse row of setigerous granulae and behind this, a second parallel to first, and interrupted in middle; lateral border with three notches, the first, placed on fore lobe between second and third

tooth, deep, second, interlobal, also deep, posterior shallow and placed near postero-lateral angle of hind lobe; hind border in middle is slightly convex, lateral of scutellum triangularly produced backwards.

Scutellum subtriangular, wider than long (16:10); disk inflated in middle; lateral borders basally marginate and slightly convex, in middle a little cut out, apically angularly rounded and slightly depressed.

Hemelytra reaching to one-third of the seventh abdominal tergite, hyaline, grayish each and with a round brown spot at middle of outer margin; coriaceous portion reduced to short, carinated baso-lateral border, which projects beyond outer margin of connexivum and to a small triangular surface at the baso-lateral angle of each hemelytron, not reaching inner border of latter; apical two-thirds of membranous portion spotted with a whitish incrustation.

Abdomen longer than wide (56:45); connexivum inclined inwards; segments separated from the dorsum and from each other by very fine sulci; on outer border of segments III to VII each provided with four big, setigerous granulæ and with a prominent infuscated spiracle, visible from above; spiracle of II ventral; spiracles of VIII (female-genital lobes) dorso-lateral. Hind border of VII deeply cut out, marginate in middle, laterally (connexivum) projecting backwards as slightly acute angles, not reaching apex of IX; lobes of VIII (female) strong dentiform, subparallel, reaching apex of IX; genital valves salient, longer than oviduct.

Propleura with a strong, longitudinal carina, which runs from lateral tubercle of collum, beneath three lateral teeth of fore lobe, to interlobal notch of pronotum, where it is interrupted and then follows beneath lateral tooth, placed in this notch.

Venter with 6 (3 + 3) longitudinal rows of round, callous spots, two (1 + 1) on connexivum and others on disk.

Scent gland openings small, placed behind middle coxæ.

Female.—Total length, 6.3 mm; width of pronotum, 2.0 mm; width of abdomen, 2.8 mm.

FIG. 3. *Camerarius wappersi* sp. nov., ♀.

Holotype.—Female. New Guinea, Friedrichs-Wilhelms Hafen, 1901 (*Biró*). Deposited in the Hungarian National Museum.[2]

I have the pleasure to dedicate this nice species to my friend and collaborator, Mr. Carlos A. Wappers, the artist of the Instituto Nacional de Investigaciones de Ciencias Naturales in Buenos Aires, who for several years has illustrated my papers.

The new species is allied to *C. pallescens* (Walker), but differs from it in the curious shape of the pronotum and other characters.

ZIMMERMANIA Usinger, 1948

This curious genus was created by Usinger for the reception of a single Fijian species, *Z. brachyptera* Usinger. It is extremely brachypterous, or "wingless," as he calls such forms. Now I am able to add a new macropterous species from New Guinea. This once more proves the hypothesis, first proposed by Wygodzinsky [(1948) 3], and then independently developed by Usinger [(1950) 176], that the so-called apterous and "wingless" forms may belong to the same genera as the macropterous.

5. ZIMMERMANIA MAGDALENÆ sp. nov.

Female.—Elongate, subparallel, from abdominal segment II forwards strongly attenuated, almost triangular; brilliant reddish brown; connexivum dorsally and legs yellow-brown; all thickly covered with whitish or yellowish calciform incrustation (Fig. 4).

Head longer than wide across eyes (15:12); anterior process practically wanting; clypeus small, slender, cariniform, reaching only to base of first antennal joint; j u g æ slender, interrupted in middle, apically curved inwards, slightly longer than clypeus, reaching to tip of antenniferous spines, but slightly shorter than base of rostral groove, which is produced forwards, constituting outermost tip of head. Antenniferous spines very stout, dentiform, exteriorly subparallel, reaching to one-fifth

FIG. 4. *Zimmermania magdalenæ* sp. nov., ♀.

[2] Mr. Biró collected for more than 50 years in New Guinea when one part of that island was under the German rule. I have retained the names of the localities as they appear on the original labels.

of first antennal joint; anteocular portion of head twice as long as postocular; eyes relatively small, but prominent semi-globose, reddish brown; postocular spines small, contiguous to eyes, not extending beyond outer border of latter; postocular margin slightly concave, posterior border rounded; two (1 + 1) longitudinal, deep, crescent-shaped, callous, grooves on vertex, betweer. eyes. Antennæ stout, as long as head and pronotum together; segment I fusiform, with a longitudinal, callous, furrow on dorsal surface; II slender, subcylindrical, slightly narrowed at base; III the longest, cylindrical; IV pyriform and with a brush of bristles apically; the two apical less incrusted; proportions of antennal joints (I to IV) 9:7:13:5.5. Rostrum short, lying in deep rostral groove, posteriorly closed.

Pronotum wider than long (29:19), subtrapezoidal, indistinctly separated into two lobes; fore lobe with anterior border slightly sinuate and provided with a thn collum; lateral borders slightly rounded and covergent; anterior angles completely concealed by a brushlike row of dense, erect bristles, heavily incrusted and pasted together; two such rows (1 + 1) placed laterally on disk, along lateral margins, with bristles directed upwards, forming two, stout, lateral carinæ; one slender row of similar bristles placed transversely behind collum; lateral rows posteriorly convergent, so that fore disk is completely surrounded by these rows; disk provided with a median row of very short bristles and four triangular callosities; lateral margin of pronotum also provided with a row of dense incrustated bristle, directed outward, which runs from humeral angle to collum, where it goes downwards along front border of prosternum and reaches corresponding row on opposite border. Posterior lobe of pronotum wider and higher; its antero-lateral borders strongly convergent forwards, lateral borders slightly convergent backwards; disk transversely inflated and provided on each side with a thick and in the middle with two thin transverse rows of short, incrusted bristle; posterior margin of hind lobe slightly sinuous in middle, and with triangular processes on each side of scutellum.

Scutellum triangular, wider than long (14:10), but distinctly longer than in *Z. brachyptera,* flat, with lateral borders slightly sinuous, and with a row of short, incrusted bristles along basal and lateral borders, interrupted in middle of former. Hemelytra reaching middle of abdominal tergite VII; whitish-

hyaline; coriaceous portion reduced to small triangles near baso-lateral angle.

Abdomen longer than wide (54 : 32); with lateral borders subparallel from segment II till after VI; basally convergent forwards, straight; on VII strongly convergent backwards and sinuous; postero-lateral angles of II and III not salient, of IV to VI a little prominent, of VII triangularly produced, and directed backwards, reaching tip of IX; spiracles small, lateral on II and visible from above; ventral on III to VII, placed near lateral border; on VIII (female-genital lobes) terminal; lobes of VIII very small, conical, twice as short as IX; genital valves slightly longer than oviduct.

Legs long, slender, unarmed, with the exception of fore tibiæ, which have a distinct subapical tooth on inner surface.

Scent-gland openings small, concealed behind middle coxæ.

Female.—Total length, 6.12 mm; width of pronotum, 1.82 mm; width of abdomen, 2.0 mm.

Holotype.—Female. New Guinea Huon-Gulf, Sattleberg, 1899 (*Biró*). Deposited in the Hungarian National Museum in Budapest.

This striking species I dedicate to my wife, Mrs. Maria Magdalena Kormilev, for her continuous aid in my entomological work.

MEZIRINI Van Duzee

CHIASTOPLONIA China, 1930

This genus was erected by China for the reception of a single species from Samoa. Later this species was found also on Marshall Islands, and a second species described from Caroline Island. Now I am able to describe three additional species, one from India and two from New Guinea. These additional species indicate a little change in the generic characters given by China. The anterior process is slightly longer than the antenniferous spines (as in *C. ponapensis* Esaki, 1951), and the corium is shorter than the scutellum only on the interior part; on the exterior it is slightly longer.

6. CHIASTOPLONIA BELLICOSA sp. nov.

Male.—Elongate, subparallel, basal part of abdomen slightly concave; brown to reddish-brown, darker in parts; rostrum and coxæ yellow-brown (Fig. 5).

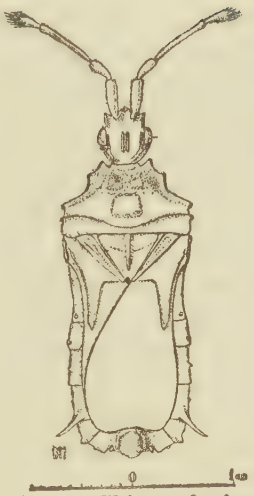

FIG. 5. *Chiastoplonia bellicosa* sp. nov., ♂.

Head subquadrate, scarcely wider across eyes than (15:14); apical process stout, short, conical, almost triangular, apically with a narrow splitting, which reaches to one-fourth of first antennal joint; antenniferous tubercles triangular, rather pointed apically, slightly shorter than apical process, directed obliquely forwards and upwards; vertex with a slender, double median and two infraocular carinæ, the latter produced posteriorly on postocular part, where they are convergent; postocular spines obsolete, not reaching outer margin of eyes; rostrum reaching tip of rostral groove; bucculæ long, anteriorly globosely inflated and with a narrow splitting, through which can be seen base of rostrum, posteriorly straight and low, leaving rostrum exposed. Antennæ stout and long, particularly the first joint, fourth pyriform and with a brush of long bristles on apical half; proportions of antennal joints (I to IV): 9:6:16:8.

Pronotum twice as wide as long on median line (37:19) front margin widely sinuous, with a small swell in middle; antero-lateral margins twice cut out, obliquely reflexed, and with a high angular border in middle; lateral margins short, subparallel; hind margin a little cut out; disk scabrous, with two (1 + 1) callosities on anterior lobe, separated by a rather deep depression; posterior lobe with a broad elevation in middle and with a low, transverse, thin carina behind it, which runs in a bowed line from middle of lateral margin to middle of posterior border, but not reaching it, and following similarly to middle of opposite lateral margin.

Scutellum triangular, wider than long (19:13), with a high, convex, median ridge, and two basal, transverse inflations; lateral borders finely carinated, basally a little swollen; tip of scutellum cut out.

Hemelytra with baso-lateral border of corium highly carinated; elevated cubital vein and elevated apical border of corium forming together a long, pointed, apical angle. Membrane gray-yellowish, rugose, without veins.

Abdomen longer than wide (49:34); spiracles arranged as follows: on segment II dorsal, placed near lateral border, on III dorso-lateral, on IV lateral, and the other (V to VII) sublateral, but very prominent and slightly visible from above. Connexivum rather narrow and slightly raised exteriorly. Lateral margin slightly divergent till after IV, then a little convergent, and almost transverse on the VII. Postero-lateral margins of V produced into a long, curved spine, directed backwards and outwards on basal half and upwards on apical length of spines subequal to length of antennal segment (9:9); postero-lateral angles of the VI produced into a small tubercle, and that of VII only angulated. Hypopygium situated on dorso-caudal surface, almost reaching tip of postero-lateral angles of abdominal segment VII; subglobose, with a median carinæ; posterior border of VII, around hypopygium, inflated; lobes of VIII (male) very small, almost tuberculiform, and with a terminal spiracle.

Ventral surface scabrous; acetabula inflated and transversely striated; hind borders of sternites broadly swollen; each sternite with four (2 + 2) elevated, rounded, callous spots.

Male.—Total length, 3.25 mm; width of pronotum, 1.25 mm; width of abdomen, 1.17 mm.

Holotype.—Male. India, Trichinopoly. Deposited in the Hungarian National Museum in Budapest.

The present species differs from all others by long spines on the fifth abdominal segment and other characters.

7. CHIASTOPLONIA OVATA sp. nov.

Male.—Elongately-ovate; brown; apex of antennal joint IV, disk of connexival segments, with the exception of anterior half of II and the hind border of the II to VI, which are infuscated, rostrum and tarsi ocraceous; the corium and membrane bronzed, base of latter with two pale yellow spots.

Head subquadrate, wider across the eyes than long (13:11); apical process short, blunt, nearly as long as the wide, triangular antenniferous spines; the latter reaching to one-third of first antennal joint; postocular spines small, dentiform, slightly projecting beyond outer margin of eyes; posterior border of head widely arcuate and slightly reflexed infraocular and parallel median carinæ on vertex slender and low; antennæ stout and long, longer than head and pronotum together (29.5:27); antennal joint I stout, subcylindrical, basally narrowed; II more slender, slightly wider towards apex; III slender and far the longest, cylindrical; all with tiny setigerous tubercles; IV ovate,

with a brush of white setæ; proportions of antennal joints (I to IV): male, 7:5:11.5:5; female, 8:6:13:6. Bucculæ low and straight, almost reaching base of head, anteriorly with a triangular, dentiform process; rostrum exposed, as long as bucculæ.

Pronotum similar to preceding species; twice wider than long (male, 31:16; female, 36:18); reflexed antero-lateral border vertical or almost vertical; median elevation of posterior lobe more raised posteriorly; bowed transverse carina and reflexed antero-lateral borders posteriorly less prominent. Scutellum wider than long (male, 15:12; female, 16:10), similar to preceding species, but median ridge lower. Hemelytra similar to preceding species, but carinated angle, formed by cubital vein and posterior border, lower.

Abdomen ovate, longer than wide (male, 43.33; female, 45:38); postero-lateral angles of segments II to IV scarcely wider than border of next segment; those of V a little wider, without long, curved spine; those of VI projecting as a small triangle; those of VII dentiform, strongly projecting backwards and a little outwards, reaching tip of hypopygium; outer margin of VII sinuate; spiracles lateral on II to IV and visible from above; sublateral on V to VII slightly visible from above only on VII; lobes of VIII (male) dentiform, slightly shorter than hypopygium and with a terminal spiracle; hypopygium subvertical, very high and very short, transversely depressed at two-thirds of its height. Lobes of VIII (female) dentiform, reaching apex of IX, and with a terminal spiracle; postero-lateral angles of VII (female) scarcely reaching apex of IX; genital valves of the same length as oviduct. Total length: male, 2.80 mm; female, 3.30 mm; width of pronotum: male, 1.07 mm: female, 1.24 mm; width of abdomen: male, 1.14 mm; female, 1.41 mm.

Holotype.—Male. New Guinea, Astrolabe Bay, Stephensort, 1897 (*Biró*). Deposited in the Hungarian National Museum in Budapest.

Allotype.—Female, collected with the hototype, in the same Museum.

Paratype.—Male. New Guinea, Astrolabe Bay, Erima-Biró coll., 1896, deposited in the Hungarian National Museum.

8. **CHIASTOPLONIA ANGULATA** sp. nov.

Male.—Very similar to *C. ovata* sp. nov., but the setigerous granulation on the three first antennal joints is almost wanting

and is replaced by fine bristles; the proportions of the antennal joints (I to IV) are: male, 7:5:12:6; female, 7:5.5:12:5.

Antero-lateral borders of pronotum projecting obliquely sidewards and upwards; median elevation of hind lobe carinated posteriorly.

Abdomen relatively longer and narrower; in male postero-lateral angles of connexival segments II to IV obtusely angulate, those of V to VI acutely angulate, distinctly projecting outwards, lateral border concave; postero-lateral angles of VII dentiform, pointed, projecting beyond tip of hypopygium; in female postero-lateral angles of connexival segments II to VI salient as a small tooth; those of VII projecting as an acute triangular process, scarcely reaching tip of lobes of VIII; the latter reaching tip of IX. Position of spiracles as in *C. ovata* sp. nov.; transverse depression of hypopygium less conspicuous.

Total length: male, 2.81 mm; female, 3.08 mm; width of pronotum: male, 1.00 mm; female, 1.15 mm; width of abdomen: male, 1.08 mm; female, 1.38 mm.

Holotype.—Male. New Guinea, Astrolabe Bay, 1899 (*Stephensort-Biró*). Deposited in the Hungarian National Museum in Budapest.

Allotype.—Male, collected with the holotype, in the same Museum.

Paratype.—Male. New Guinea, Astrolabe Bay, Erima-Biró coll., 1896, deposited in the collection of the author.

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FAUNA INDOMALAYENSIS, IV: 141. BEITRAG ZUR MORPHOLOGIE UND SYSTEMATIK DER SCOLYTOIDEA

Von Karl E. Schedl
Lienz, Austria

Nachdem Dr. L. G. E. Kalshoven die Absicht hat, forstentomologische Studien über Java zu veröffentlichen, schien es angezeigt, dieses Faunengebiet neuerdings zu bearbeiten und insbesondere die mir vom verstorbenen Forstrat Eggers überlassenen Restbestände nochmals zu überprüfen. Diese Aufgabe begegnete insoferne gewissen Schwierigkeiten, als es sich meist um Einzelstücke und in den meisten Fällen um bereits von Forstrat benannte Exemplare handelte, deren Artberechtigung oder Verwandtschaftszugehörigkeit zweifelhaft war. Ich habe mich bemüht, diese fraglichen Stücke einer Klärung zuzuführen und es verbleiben nur mehr ganz wenige Einzelexemplare, die erst dann bearbeitet werden Können, wenn mehr Material vorliegt.

BERICHTIGUNGEN

SCOLYTUS JAVANUS Chapuis.

Scolytus javanus Chapuis, Synopsis des Scolytides, Mem. Soc. Roy. Sci. Liege (1869) 56.

Die Einzeltype im Museum Brüssel trägt die Etikette "Java, Solier, dejean" und ist, wie ich mich selbst überzeugen konnte, mit *Scolytus multistriatus* Marsh. identisch. Die Bezeichnung "*javanus*" hat mit der Insel Java nichts zu tun, sondern bezieht sich auf einen kleinen Ort unweit von Lüttich, wo dieses Stück gefunden wurde. Damit ist erwiesen, dass die Gattung *Scolytus* auf Java nicht vorkommt.

HYLESINUS CRASSUS Beeson.

Hylesinus crassus Beeson, Insects of Samoa, Part IV (1929) 220 = *Hylesinus subcostatus* Eggers, Zool. Meded. Leyden 7 (1923) 137.

Mehrere Metatypen von *Hylesinus subcostatus* Eggers mit Type von *H. crassus* Beeson, in British Museum verglichen.

DIAMERIDES Browne

Diamerides Browne, Mag. Nat. Hist. Ann. ser. 12 1 (1948) 893 1st identisch mit meiner Gattung *Phlœocranus*, Tijdschr. v. Ent. 85 (1942) 7.

PŒCILIPS (DENDRURGUS, THAMNURGIDES) SIMILIS Eggers.

Pœcilips (*Dendrurgus, Thamnurgides*) *similis* Eggers ist ein *Coccotrypes* und mit. *C. myristicæ* Roepke näher verwandt.

CROSSOTARSUS SEXPORUS Schedl.

Crossotarsus sexporus SCHEDL, Philip. Jour. Sci. 57 (1935) 484; gehört in die Gattung *Platypus* und zwar in die Artengruppe Platypi spinulosi.

HYPOTHENOIDES Hopkins

Hypothenoides HOPKINS, Class. Cryph., U.S.D.A. Tech. Ser. XVII, part II (1915) 11, ist einzuziehen, weil diese Gattung mit *Cryphalomorphus* Schauf. identisch ist.

XYLEBORUS JUCUNDUS nom. nov.

Xyleborus truncatellus m. [Tijdschr. v. Ent. 93 (1950) 79] muss umbenannt werden, weil der Name bereits vergeben ist [Rev. Bras. Biol. (3) 9 (1949) 272].

DRUCKFEHLERBERICHTIGUNGEN

SCHEDL, Philip. Jour. Sci. 81 (1952) 61, Zeile 13 von oben "*Scolytus deimo* Blandf." soll heissen "*Scolytoplatypus deimo* Blandf." und p. 65, Zeile 17 von oben *Xyleborus onepotulus* Egg." wäre richtig zu stellen auf "*Xyleborus anepotulus* Egg."

SCHEDL, Tijdschr. v. Ent. 93 (1950) 52. Am Ende der Beschreibung des Weibchens von *Scolytoplatypus papoanus* Egg. soll die Bezeichnung 3 ♀ ♀ durch 3 ♂ ♂ ersetzt werden.

SCOLYTOMIMUS DILUTUS Blandford.

SCHEDL, Mag. Nat. Hist. Ann. ser. 12 6 (1953) 291, ist irrtümlicherweise als Autor Eichhoff angegeben.

FUNDORTE UND WIRTSPFLANZEN

Familie SCOLYTIDEÆ

Diamerus curvifer Walk.—Batoerraden, G. Slamet, Oktober 20, 1929, ex pohon boeloe karet, ex pohon djirek (*Symplocos* sp. div.), F. C. Drescher.

Hylesinus philippinensis Egg.—Batoerraden, G. Slamet, Juli 19, 1930, ex pohon kebek (*Ficus* sp. div.), F. C. Drescher.

Hylesinus scobipennis Chap. (*javanus* Egg.)—Dapok bei Batavia, Dezember 25, 1948; Juni, 1949, C .v. Nidek (Zool. Mus. Amsterdam); Batoerraden, G. Slamet, Oktober 20, 1929, ex pohon wilada (*Ficus fistulosa* Reinw.), F. C. Drescher.

Ein Vergleich von Metatypen des *Hylesinus scobipennis* Chapuis mit Meta- und Cotypen von *Hylesinus javanus* Egg. ergab keine nennenswerten Unterschiede, abgesehen von der Grösse, so dass wenig Zweifel über die Synonymie bestehen. *Hylesinus javanus* Egg. müsste eingezogen werden.

Hylesinus similis Egg.—Batoerraden, G. Slamet, Oktober 20 und 21, 1929, ex pohon boeloe karet, F. C. Drescher.

Hyledius asper Samps.—Sumatra: Manindjan, Januar 17, 23, und 24, 1931, ex *Myristica fragrans*, L. G. E. Kalshoven (S. 528, Sc. 134).

Ptilopodius kalshoveni sp. nov.—Mt. Gédé, 800 m, November, 1924, L. G. E. Kalshoven (d 194 d, Sc. 94).

Ptilopodius minutissimus Schedl—Semarang, Teak-forest, Dezember 13, 1922, L. G. E. Kalshoven (S. 664, Sc. 111).

Etwas grösser als die Typen von den Philippinen, aber ansonsten mit diesen vollkommen übereinstimmend.

Hypothenemus areccæ Horn.—Dapok bei Batavia, März, 1950, C. v. Nidek (Zool. Mus. Amsterdam); Batavia, Juli und September, 1948, C. v. Nidek (Zool. Mus. Amsterdam).

Cryphalus javanus sp. nov.—Buitenzorg, 250 m, Februar, 1924, L. G. E. Kalshoven (d 24, Sc. 86); Semarang, 40 m, Dezember 24, 1926, Fr. A. Th. H. Verbeek (663 w).

Stephanoderes glabripennis Hopk.—Madian Piaraan Walikoekoen, Mai 13, 1929, Fr. A. Th. H. Verbeek.

Stephanoderes ingens Schedl—Dapok bei Batavia, März, 1950, C. v. Nidek (Zool. Mus. Amsterdam).

Stephanoderes javanus Egg.—Semarang, Teak-forest, November 26, 1922, L. G. E. Kalshoven (C. 113 b, Sc. 9 d).

Hypocryphalus constrictus Schedl—Buitenzorg, September 27, 1923, L. G. E. Kalshoven (Sc. 65); Semarang, Teak-forest,, Dezember, 1924, L. G. E. Kalshoven (d 195 b, Sc. 93).

Die Originalbeschreibung bezieht sich auf das Männchen. Das Weibchen ist etwas gedrungener, der Halsschild mehr gewölbt, die Seiten von hinten nach vorne weniger bogig verengt und der Vorderrand breit gerundet, ebenso sind die vorderen Zähnchen in bezug auf deren Grösse weniger voneinander abweichend, die Zähnchen auf dem Höckerfleck des Halsschildes sind etwas grösser.

Coccotrypes carpophagus Horn.—Sumatra, Tobacco; Western Java, 1918, Dr. Van Hall, ex palm seeds (*Chrysalidocarpus* sp.).

Coccotrypes dactyliperda F.—Priok, Februar, 1927, L. G. E. Kalshoven (Sc. 64 e. 92).

Coccotrypes myristicæ Röpke.—Java.

Pœcilips subnitidus sp. nov.—Buitenzorg, 250 m, März 16, 1924, L. G. E. Kalshoven (d 29 a, Sc. 96 d).

Pœcilips vulgaris Schauf.—Tjikopoh, Februar 19, 1950, C. v. Nidek (Zool. Mus. Amsterdam); Batoerraden, G. Slamet,

Oktober 20, 1929 und April 9, 1930, ex pohon wilada (*Ficus fistulosa* Reinw.); ex pohon angroong, F. C. Drescher.

Xyleborus agnatus Egg.—Batoerraden, G. Slamet, April 10, 1930, ex pohon belis, F. C. Drescher; Batoerraden, G. Slamet, April 9, 1930, ex pohon pari, F. C. Drescher (L.).

Xyleborus amphicranoides Hag.—Batoerraden, G. Slamet, Oktober 10, 1929, ex pohon wilada (*Ficus fistulosa* Reinw.), F. C. Drescher.

Xyleborus amphicranulus Egg.—Batoerraden, G. Slamet, Oktober 22, 1929, ex pohon woeroe, F. C. Drescher.

Xyleborus andamanensis Blandf.—Batoerraden, G. Slamet, Oktober 20, 1929, ex pohon dadap, ex pohon wilada (*Fiscus fistulosa* Reinw.), F. C. Drescher; Batoerraden, G. Slamet, October 22, 1929, ex pohon wéwé, F. C. Drescher; Batoerraden, G. Slamet, ex pohon kajoe plempeng, F. C. Drescher, April 7, 1930; Batoerraden, G. Slamet, April 9, 1930, ex pohon tontoman, F. C. Drescher.

Xyleborus artestriatus Eichh.—Buitenzorg, 250 m, L. G. E. Kalshoven (623 c, 183 d), Oktober 15, 1923, Juli 1, 1924; Tg. Karang, März, 1950, C. v. Nidek (Zool. Mus. Amsterdam).

Xyleborus astutus sp. nov.—Java.

Xyleborus alterrimus Egg.—Bandjar, Dezember 16, 1930, L. G. E. Kalshoven (13 b, CW 233 b).

Xyleborus barbatus Hag.—Ambon, Mai, 1925, leg. Leefmans (Sc. 131).

Xyleborus cancellatus Egg.—Batoerraden, G. Slamet, Oktober 20, 22, 1929 und April 9, 1930, ex pohon dadap, pohon wéwé, pohon pari, pohon woeroe djenoe, F. C. Drescher; Preanger, G. Tangkoeban Prahoe, 4,000–5,000 Voet, Juli 20, 1930, F. C. Drescher.

Xyleborus ciliatus Egg.—Batoerraden, G. Slamet, April 8 und 9, 1930, ex pohon kemoedjing, pohon angroong, F. C. Drescher.

Xyleborus cinchonæ Veen.—Batoerraden, G. Slamet, Oktober 20, 1929, ex pohon wilada (*Ficus fistulosa* Reinw.), F. C. Drescher; Preanger: G. Tankoeban-Prahoe, 4,000–5,000 Voet, Januar 14, 1930, F. C. Drescher.

Xyleborus circumcisulus sp. nov.—Batoerraden, G. Slamet, April 10, 1930, ex pohon tembagan (*Eugenia lineata* Duthie, Myrtaceæ), F. C. Drescher.

Xyleborus coffeæ Wurth.—Tjampea, 500 m, 1925, L. G. E. Kalshoven (86 c).

Xyleborus cognatus Blandf.—Batavia, März, 1948, C. v. Nidek (Zool. Mus. Amsterdam).

Xyleborus cylindripennis sp. nov.—Batoerraden, G. Slamet, April 10, 1930, ex pohon sarangan (*Castanea argentea* Bl.), F. C. Drescher.

Xyleborus difficilis Egg.—Batoerraden, G. Slamet, April 10, 1930, ex pohon plembeng, F. C. Drescher.

Xyleborus discolor Blanddf.—Mt. Preanger, 1,400 m, Juni 23, 1927, L. G. E. Kalshoven (138).

Xyleborus elegans Samps.—Buitenzorg, 250 m, September 30, 1923, L. G. E. Kalshoven (e 910, Sc. 62 a).

Xyleborus emarginatus Eichh.—Preanger, G. Tangkoeban-Prahoe, 4,000–5,000 Voet, März 11 und 24, 1930, F. C. Drescher.

Xyleborus exiguus Walk.—Batoerraden, G. Slamet, April 10, 1930, F. C. Drescher.

Xyleborus fallax Eichh.—Batoerraden, G. Slamet, April 7, 1930, ex pohon kajoe plembeng, F. C. Drescher; Batoerraden, G. Slamet, April 2, 9, und 10, 1930, ex pohon woeroe djamoer (? Lauraceæ), pohon sarangan (*Castanea argentea* Bl.), pohon nagasari (*Mesua ferrea* Linn.), F. C. Drescher; Batoerraden, G. Slamet, Juli 19, 1930, ex pohon bantjet (*Turpinia pomifera* DC.); Tjisaroea, Mai 22, 1950, C. v. Nidek (Zool. Mus. Amsterdam).

Xyleborus fornicatus Eichh.—Batoerraden, G. Slamet, April 8 und 9, 1930, ex pohon dadap doerie (*Erythrina lithosperma* Miq.), pohon sarangan (*Castanea argentea* Bl.), pohon sengon (*Albizzia* sp.), pohon tontoman, pohon angroong, F. C. Drescher.

Xyleborus funereus Lea.—Dapok bei Batavia, Februar 29, 1948, C. v. Nidek (Zool. Mus. Amsterdam).

Xyleborus fuscus Egg.—Mount Salak, August, 1929, L. G. E. Kalshoven (703, Sc. 36); Batoerraden, G. Slamet, Oktober 20 und 21, 1929, ex pohon wilada (*Ficus fistulosa* Reinw.), pohon boeloe karet, pohon sambang, F. C. Drescher.

Xyleborus hybridus Egg.—Batoerraden, G. Slamet, Oktober 20, 1929, ex pohon wilada (*Ficus fistulosa* Reinw.), F. C. Drescher.

Xyleborus indicus Eichh.—Batoerraden, G. Slamet, Oktober 21, 1929, ex pohon sambang, F. C. Drescher; Batoerraden, G. Slamet, April 2 und 9, 1930, ex pohon kajoe dadap, pohon soerian, F. C. Drescher.

Xyleborus javanus Egg.—Batoerraden, G. Slamet, Oktober 20, 1929, ex pohon wilada (*Ficus fistulosa* Reinw.), F. C.

Drescher; Batoerraden, G. Slamet, Februar 6, 1930, F. C. Drescher; Bandjar, Dezember 29, 1930, ex *Swietenia mahagoni* Jacq., L. G. E. Kalshoven (S. 518, Sc. 12).

Xyleborus limatus Schedl—Batoerraden, G. Slamet, April 9, 1930, ex pohon tontoman, pohon doerian, F. C. Drescher.

Xyleborus marginatus Egg.—Batoerraden, G. Slamet, Oktober 20 und 22, 1929, ex pohon wilada (*Ficus fistulosa* Reinw.), pohon kebek, pohon woeroe, F. C. Drescher; Batoerraden, G. Slamet, April 7, 9, und 10, 1930, ex kajoe plembeng, pohon sengon (*Albizzia* sp.), pohon soerian pohon dadap doerie, pohon djirek (*Symplocos* sp. div.), F. C. Drescher.

Xyleborus mascarensis Eichh.—Batavia, Oktober, 1948, C. v. Nidek (Zool. Mus. Amsterdam).

Xyleborus morigerus Blandf.—Batoerraden, Slamet, April 8, 9, 1930, ex pohon kemoedjing, pohon pari, pohon angroong, F. C. Drescher (W).

Xyleborus nepotulomorphus Egg.—Batoerraden, G. Slamet, April 9, 1930, ex pohon pari, F. C. Drescher (L.).

Xyleborus nitidipennis Schedl—Batoerraden, Slamet, April 30, 1930, F. C. Drescher.

Xyleborus nobilis Egg.—Batoerraden, G. Slamet, Oktober 22, 1929 und Februar 6, 1930, ex pohon woeroe, F. C. Drescher; G. Tangkoeban-Prahoe, 4,000–5,000 Voet, Preanger, Februar 18 und März 24, 1930, F. C. Drescher.

Xyleborus obtusus Egg.—W. Java: s. Pr. Djampang, Juli 16, 1926, L. G. E. Kalshoven (S. 284) ; Preanger, G. Tangkoeban-Prahoe, 4,000–5,000 voet, Juli 20, 1930, F. C. Drescher.

Xyleborus opacicauda Egg.—Batoerraden, G. Slamet, Februar 6, 1930, F. C. Drescher.

Xyleborus parvulus Eichh.—Batavia, Versch. 1947–1949 C. v. Nidek, (Zool. Mus. Amsterdam).

Xyleborus pernitidus sp. nov.—Batoerraden, Juli 17, 1930, F. C. Drescher.

Xyleborus posticestriatus Egg.—Buitenzorg.—Buitenzorg, 250 m, Oktober 6, 1924, L. G. E. Kalshoven; Sumatra: Soeban Ajam, August, 1926, L. C. E. Kalshoven (67) ; Z. Sumatra, November, L. G. E. Kalshoven (68 a).

Xyleborus scabripennis Blandf.—Batoerraden, G. Slamet, Oktober 22, 1929, ex pohon woeroe, F. C. Drescher.

Xyleborus semigranosus Blandf.—Gombong, Juni, 1926, L. G. E. Kalshoven (Sc. 129, 59 b) ; Batoerraden, G. Slamet, April 9, 1930, ex pohon sengon (*Albizzia* sp.), F. C. Drescher (V).

Xyleborus sereinus Egg.—Batoerraden, G. Slamet, April 10, 1930, F. C. Drescher, ex pohon belis.

Xyleborus similis Ferr.—Batotan, Fr. A. Th. H. Verbeek (54); R. Semarang, Gedongan, 40 m, September, 1927, Fr. A. Th. H. Verbeek; Op. Walikoekoen, Juli 31, 1928, Fr. A. Th. H. Verbeek (31/34); Buitenzorg, Sibi, Juli, 1924, 250 m, L. G. E. Kalshoven; Gombong, Juni, 1926, L. G. E. Kalshoven (59 d); Semarang, Teak-forest, September 13, 1928, L. G. E. Kalshoven; Pasir Waringin, Dezember, 1928, L. G. E. Kalshoven (468); Batavia, März, 1948, C. v. Nidek (Zool. Mus. Hamburg); Bandoeng, Dapok bei Batavia, Oktober 28, 1948, C. v. Nidek (Zool. Mus. Amsterdam).

Xyleborus siobanus Egg.—Batoerraden, G. Slamet, April 5, 7, und 9, 1930, ex pohon djirek (*Symplocos* sp. div.), pohon kajoe plembeng, pohon dadap doerie, F. C. Drescher; Preanger, G. Tangkoeban-Prahoe, 4,000–5,000 Voet, April 21, 1930, F. C. Drescher.

Xyleborus striatotruncatus Schedl (*nitidior* Egg.)—Batoerraden, G. Slamet, Oktober 20, 1929, F. C. Drescher, ex pohon boeloe karet.

Xyleborus subparallelus Egg.—Batoerraden, G. Slamet, April 7 und 8, 1930, ex pohon kajoe plembeng, pohon kemoedjing, pohon tolaman, F. C. Drescher.

Xyleborus tegalensis Egg.—Batoerraden, G. Slamet, Oktober 22, 1929 und April 6, 1930, ex pohon woeroe djamoer, pohon wéwé, F. C. Drescher; G. Tankoeban-Prahoe, 4,000–5,000 Voet, Preanger, Dezember 23, 1929, F. C. Drescher.

Xyleborus testaceus Walk.—Poerworedjo, Mai 27, 1923, L. G. E. Kalshoven (C 783); Buitenzorg, 250 m, 1924, L. G. E. Kalshoven. Mount Gédé, Tjisarsen big Camp., April, 1926, L. G. E. Kalshoven; Bantam, Mai, 1928, ex Hessea und Pasir war, L. G. E. Kalshoven (257 c); Pekalongan, Walifuekoen, Permalong, 1928, Fr. A. Th. H. Verbeek (475); Batoerraden, G. Slamet, Oktober 20, 1929, ex pohon dadap, F. C. Drescher; Preanger, Bandoeng, Dogo, Oktober 28 und November 13, 1929, F. C. Drescher; Batoerraden, G. Slamet, April 8 und 9, 1930, ex pohon tontoman, pohon soerian, F. C. Drescher; Bandoeng, Oktober 28, 1948, C. v. Nidek (Zool. Mus. Amsterdam); Batavia, Februar, 1949, C. v. Nidek (Zool. Mus. Amsterdam); Gg. Karang, September, 1949, A. v. Laer (Zool. Mus. Amsterdam); Tg. Karang, März, 1950, C. v. Nidek (Zool. Mus. Amsterdam);

Panggerango, Tijbodas, 1,400 m, November, 1949, A. M. Neervoort (Zool. Mus. Amsterdam); Mount Gédé.

Xyleborus theæ Egg.—Maswati, 1,400 ft., ex Tea; Buitenzorg, L. G. E. Kalshoven.

Xyleborus ursulus Egg.—Batoerraden, G. Slamet, Oktober 20 und 22, 1929, ex pohon wilada (*Ficus fistulosa* Reinw.), pohon dadap, pohon kebek (*Ficus* sp. div.), pohon wéwé, pohon woeroe djenoe, pohon woeroe, F. C. Drescher.

Xyleborus vestitus Schedl—Batoerraden, G. Slamet, April 10 und Juli 18, 1930, ex pohon karet pertja (*?Palaquium* sp.), pohon passang (pasang, *Quercus* sp. div.), F. C. Drescher.

Acanthotomicus dentatus sp. nov.—Wahrscheinlich Java: Dapok.

Xyleboricus malayensis Schedl—Batoerraden, G. Slamet, April 10, 1930, ex pohon karet pertja (*?Palaquium* sp.), F. C. Drescher.

Eccoptopterus gracilipes Eichh.—Batoerraden, G. Slamet, Oktober 20, 1929, ex pohon dadap, F. C. Drescher; Batoerraden, G. Slamet, April 9, 1930, ex pohon soerian, F. C. Drescher; Bandjar, Juli 19, 1930, L. G. E. Kalshoven (349).

Eccoptoptopterus limbus var. *duplicatus* Egg.—Kediri, März, 1925, L. G. E. Kalshoven (625).

Eccoptopterus sexspinosus Motsch.—Batoerraden, G. Slamet, Oktober 22, 1929, ex pohon kalba, F. C. Drescher.

Scolytoplatypus brahma Blandf. (*hamatus* Hag.).—Batoerraden, G. Slamet, Oktober 22, 1929, ex pohon sengen (*Albizzia* sp.), pohon kalba, F. C. Drescher; Preanger: G. Tangoekan-Prahoe, 4,000–5,000 Voet, März 24, 1930, F. C. Drescher.

Scolytoplatypus javanus Egg.—W. Java: S. Pr. Djambang, 500 m, September 21, 1920, L. G. E. Kalshoven (145 b); Batoerraden, G. Slamet, Oktober 20, 1929, ex pohon wilada (*Ficus fistulosa* Reinw.), F. C. Drescher; Batoerraden, G. Slamet, April 9, 1930, ex pohon soerian, pohon woeroe djenoe, F. C. Drescher.

Scolytoplatypus nitidus Egg.—Batoerraden, G. Slamet, Oktober 20, 1929 ex pohon wilada (*Ficus fistulosa* Reinw.), F. C. Drescher.

Hyorrhynchus pilosus Egg.—Salatiga, 600 m, November 10, 1922, L. G. E. Kalshoven (C 651).

Hyorrhynchus striatulus sp. nov.—Wahrscheinlich Java.

Familie PLATYPODIDEÆ

Platypus caliculus Chap.—Tg. Karang, November, 1949, März, 1950, C. v. Nidek (Zool. Mus. Amsterdam).

Platypus cupulatus Chap.—Redjosari, März, 1950, C. v. Nidek (Zool. Mus. Amsterdam); Tg. Karang, November, 1949, A. v. Laer (Zool. Mus. Amsterdam).

Platypus forficula Chap.—Redjosari, März, 1950, C. v. Nidek (Zool. Mus. Amsterdam).

Platypus insularis Strohm.—Redjosari, März, 1950, C. v. Nidek (Zool. Mus. Amsterdam).

Platypus nitidulus sp. nov.—Mount Gédé, 800 m, Dapos, Saninten, August, 1933, L. G. E. Kalshoven (Pl. 460).

Platypus perinimicus Schedl—Mount Gédé, 800 m, November, 1924, L. G. E. Kalshoven (d 141 g).

Platypus saltatorinus sp. nov.—Mount Gédé, 800 m, November, 1924, L. G. E. Kalshoven (d 194 b).

Platypus saundersi Chap.—Batavia, August, 1949, C. v. Nidek (Zool. Mus. Amsterdam); Tg. Karang, September, 1949, A. v. Laer (Zool. Mus. Amsterdam).

Platypus solidus Walk.—Redjosari, März, 1950, C. v. Nidek (Zool. Mus. Amsterdam).

Platypus strigillatus Schedl—Mount Gédé, 800 m, November, 1924, L. G. E. Kalshoven (d 194, Pl. 26 a).

Diapus minor sp. nov.—Mount Gédé, 800 m, November, 1924, L. G. E. Kalshoven (d 141 j).

HYORRHYNCHUS STRIATULUS sp. nov.

Dunkelrotbraun, 1.8 mm lang und 2.5 mal so lang wie breit. Dem *Hyorrhynchus pilosus* Egg. nahestehend, aber die Flügeldecken viel kräftiger gestreift, die Zwischenräume auf der Scheibe nahezu glatt und der Hinterrand der Flügeldecken mit deutlichen Zähnchen.

Stirn deutlich enger als der Halsschild, leicht gewölbt, zwischen den stark auf die Vorderseite gerückten oberen Augenhälften verhältnismässig eng, wesentlich enger als die Basis der Mandibeln. Oberfläche nahezu matt, granuliert-punktiert, mit einem feinen Längskielchen zwischen den Augen; Behaarung sehr kurz, anliegend, beinahe schuppenförmig.

Halsschild nahezu rechteckig, etwas breiter als lang (21.5: 18.0), die hinteren Seitenecken rechtwinkelig und kaum gerundet, die Seiten nur ganz leicht geschwungen, so dass die vorderen Seitenecken deutlich hervortreten, Vorderrand sehr breit

gerundet; Scheibe leicht gewölbt, mässig glänzend, im apikalen Drittel fein gekörnt-geschuppt, im basalen Teil auf winzig punktuliertem Grunde feine Puncktchen mit einzelnen Härchen im vorderen Drittel. Schildchen knopfförmig.

Flügeldecken wenig breiter und etwa 1.85 mal so lang wie der Halsschild, die Seiten bis gut über die Mitte parallel, Apex gleichmässig gerundet, Absturz kurz, deutlich hinter der Mitte beginnend und einfach gewölbt; Scheibe mit kräftigen und gut begrenzten Streifen, in denen die einzelnen Reihenpunkte schwer zu erkennen sind, die Zwischenräume glänzend, kaum merklich gewölbt und leicht quergerunzelt, so dass vereinzelt winzige Pünktchen kaum zu erkennen sind, an der Basis im Raume des 1. bis 4. Zwischenraumes dicht und fein gekörnt, Absturz mit den Zwischenräumen enger, mehr matt und einreihig gekörnt, jedes Körnchen trägt ein gelbes schuppenförmiges Hörchen, in Fortsetzung des dritten Zwischenraumes am Hinterrand ein deutliches Zähnchen, ein ebensolches in Verlängerung des 5. und 7. Zwischenraumes.

Type in Sammlung Schedl.

Fundort: Wahrscheinlich Java.

HYORRHYNCHUS PILOSUS Eggers, masc. nov.

Männchen.—Gelbbraun, 1.2 mm lang, zirka 1.7 mal so lang wie breit.

Stirn wesentlich schmäler als der Halsschild, flach gewölbt, mässig glänzend, unregelmässig und zum Teil undeutlich punktiert, mit einem Längskiel in der unteren Bälfte, mit feinen, nach unten gerichteten Härchen, die obere Hälfte der geteilten Augen ganz auf die Stirn gerückt und von unteren Teil durch eine breite, leicht gewölbte Fläche getrennt.

Halsschild wesentlich breiter als lang, die hinteren Seitenecken rechtwinkelig, die Seiten in der basalen Hälfte nahezu parallel, dann stark zum nahezu quergestellten Vorderrand gerundet; Scheibe flach gewölbt, glänzend, ziemlich dicht mit flachen, vorne etwas gedrängter stehenden Punkten besetzt, von denen feine gelbe Haare entspringen.

Flügeldecken deutlich breiter und doppelt so lang wie der Halsschild, gedrungen eiformig im Umriss, der Absturz in der Mitte beginnend und gleichförmig gewölbt, Scheibe eng, aber tief gestreiftpunktiert, die Punkte emger oder weniger undeutlich, die Streifen beiderseitig gut begrenzt, die Zwischenräume flach gewölbt und jeder derselben mit einer unregelmässigen Reihe feiner Körnchen, diese in der Nähe der Basis durch

Punkte ersetzt; das Haarkleid ziemlich dicht, lichtgelb, am Absturz etwas zottig erscheinend.

Type in Sammlung Schedl.

Fundort: JAVA, Salatiga, 600 m, November 10, 1922, Nr. C 651, L. G. E. Kalshoven.

COCCOTRYPES MYRISTICÆ Ropke.

Forstrat Eggers hat seinerzeit *Coccotrypes insulindicus* als eigene Art ausgeschieden und wohl auch derart bezeichnete Stücke abgegeben. Soweit solche in meine Hände gelangten, habe ich dieselben eingehend mit *Coccotrypes myristicæ* Röpke verglichen und finde keinen stichhältigen Unterschied, so dass es geraten erscheint, wenigstens vorderhand die Eggers' sche Bezichnung fallen zu lassen. Unter den mir von Forstrat Eggers gezeigten Material befand sich auch ein Männchen, welches ich nunmehr kurz beschreibe.

Männchen.—Gelbbraun, 1.5 mm lang, 2.26 mal so lang wie breit.

Stirn leicht gewölbt, lackglänzend, im unteren Teil mit winzigen behaarten Pünktchen.

Halsschild etwas länger als breit, spitz eiförmig im Umriss, Basis leicht gebogen, die Scheibe mässig gewölbt und in ihrer ganzen Ausdehnung mit locker gestellten feinen Körnchen besetzt, die kurze abstehende Härchen tragen. Schildchen sehr klein.

Flügeldecken deutlich breiter als der Halsschild (19.0:17.2), ebenfalls spitz eiförmig im Umriss, im basalen Drittel leicht ansteigend und dann schief abgewölbt, Punktreihen nur angedeutet, die Punkte selbst locker gestellt, die Zwischenräume etwas runzelig und mit kaum wahrnehmbaren Pünktchen, die auf dem Absturz in winzige Körnchen überzugehen scheinen, die Zwischenraumpunkte bezw. Körnchen tragen lange abstehende Härchen.

Type in Sammlung Schedl.

Fundort: Java.

POECILIPS SUBNITIDUS sp. nov.

Rotbraun, 1.7 mm lang, 2.3 mal so lang wie breit. Verglichen mit *Poecilips persicæ* Hopk., ist die neue Art etwas grösser, der Halsschild flacher gebaut und die Halsschildpünktchen sind noch undeutlicher.

Stirn schmal, leicht gewölbt, mit Andeutungen eines Mittelkiels, ziemlich dicht punktiert und zerstreut behaart.

Halsschild breiter als lang (20: 18), am Beginn des basalen Drittels am breitesten, von dort gegen die abgeordneten hinteren Seitenecken etwas zusammenlaufend, vor der breitesten Stelle ebenfalls trapezförmig, aber stärkar verengt, Apikalrand breit gerundet, Scheibe glänzend, flach gewölbt, mit sehr kleinen Pünktchen locker besetzt, von denen frei abstehende Haare entspringen. Schildchen gross, dreieckig.

Flügeldecken deutlich breiter und 1.7 mal so lang wie der Halsschild, die Seiten bis zur Mitte parallel, dann bogig verengt, Apex eng, eiförmig gerundet, Absturz in der Mitte beginnend, flach schief, gewölbt, Scheibe mit Reihen ziemlich kräftiger Punkte, die nicht ganz regelmässig angeordnet sind, die Zwischenräume eben, etwas gerunzelt und einreihig mit viel kleineren Punkten besetzt; auf dem Absturz liegen die Reihenpunkte in deutlich vertieften Streifen und die Zwischenraumpunkte scheinen durch winzige Körnchen ersetzt.

Type in Sammlung Schedl.

Fundort: JAVA, Buitenzorg, 250 m, März 16, 1924, d 29 a, Sc. 96 d, L. G. E. Kalshoven.

Weitere Stücke sind wahrscheinlich im U. S. Nat. Museum und wurden ursprünglich alle von Forstrat Eggers als neue Art unter den oben genannten Namen ausgeschieden.

CRYPHALUS JAVANUS sp. nov.

Gelbbraun, 1.5 bis 1.7 mm lang, 1.8 mal so lang wie breit. Ein Verwandter der *Cryphalus resiniferi* Schedl, aber wesentlich kleiner, mit winzigem Halsschild-Schildchen und schuppenförmiger Unterwolle auf den Flugeldecken.

Stirn schmal, weil die Augen etwas nach vorne gerückt, abgeflacht, mit einem dreieckigen Endruck äber dem Epistomalrand, matt und kaum erkennbar punktiert.

Halsschild breiter als lang (24 : 19), an der Basis am breitesten, hintere Seitenecken kaum gerundet, von der Basis an im kräftigen Bogen nach vorne verengt, der Vorderrand eng gerundet und mit vier bis sechs winzigen Zähnchen; Summit kurz vor der Basis, vorne schief abfallend, winzig punktuliert und mit zerstreuten, ganz kleinen Schuppenhöckerchen, Unterwolle anliegend, schlank, schuppenförmig, Grannenhaare abstehend. Schildchen winzig klein.

Flügeldecken etwas beiter und 1.4 mal so lang wie der Halsschild, die Seiten im basalen Drittel parallel, Apex stumpf eiförmig gerundet, der Absturz beginnt nach dem ersten Drittel und ist gut gewölbt; die Punktreihen lediglich engedeutet,

die Pünktchen selbst schwer erkennbar, die Zwischenräume breit und dicht mit anliegenden Schuppenhärchen bedeckt, zusätzlich jeder Zwischenraum mit einer Reihe abstehender Börstchen, die auf dem absturz etwas kräftiger werden.

Typen in Sammlung Schedl und Kalshoven.

Fundort: JAVA, Buitenzorg, 250 m, Februar, 1924, Nr. d 24, Sc. 86, L. G. E. Kalshoven; JAVA, Semarang, 40 m, Dezember 24, 1926, Nr. 663 w, Fr. A. Th. H. Verbeek.

PTILOPODIUS KALSHOVENI sp. nov.

Weibchen.—Gelbbraun, 1.4 mm lang, 2.2 mal so lang wie breit. Ein besonders fein skulptierter Käfer, ohne nennenswerte Flügeldeckenpunktierung und mit sehr grosser Fühlerkeule.

Stirn breit, leicht gewölbt, nahezu matt, weil winzig punktuliert und kaum wahrnehmbar punktiert.

Halsschild breiter als lang (19 : 15), stark gewölbt, Basis gerade, hintere Seitenecken gerundet, die Seiten im basalen Drittel nahezu parallel, Apek breit gerundet, Apikalrand mit vier leicht vorstehenden Zähnchen, von denen die mittleren zwei nur wenig grosser sind; summit in der mitte, vorne kräftig gewölbt, sehr dicht und sehr fein geschuppt-gehöckert, diese Schuppenhöckerchen auch etwas über die Mitte des Halsschildes übergreifend, die kurze Basalfläche matt und winzig punktuliert. Schildchen gross, dreieckig.

Flügeldecken so breit und 1.8 mal so lang wie der Halsschild, parallelseitig und zylindrisch, Apikalrand kurz und breit gerundet, Absturz in der Mitte beginnend, wenig kräftig schief gewölbt; die ganzen Flügeldecken winzig punktuliert, ohne jede Anzeichen von Punktreihen und mit einem Flaum winziger, dichtgestellter Härchen bedeckt.

Ein Stück, welches ich fur das Männchen halte, ist ähnlich gebaut, aber der Halsschild ist vorne mehr dreieckig gerundet, Summit kurz vor der Basis und von hier gegen den Apex schief und kaum merklich gewölbt, die Schuppenhöckerchen ausserdem viel kleiner.

Typen in Sammlung Schedl und Kalshoven.

Fundort: JAVA, Mt. Gédé, 800 m, November, 1924, d 194 d, Sc. 94, L. G. E. Kalshoven.

ACANTHOTOMICUS DENTATUS sp. nov.

Weibchen.—Gelbbraun, wahrscheinlich unausgefärbt, 1.9 mm lang, 3.0 mal so lang wie breit. Der allgemeinen Form nach dem Acanthotomicus latedeclivis Schedl ähnlich, aber wesent-

lich kleiner, die Punkte in den Reihen auf der Flügeldeckenscheibe nach hinten nur unwesentlich grösser werdend und die Absturzbezahnung einfacher.

Stirn mässig breit, leicht gewölbt, etwas körnelig punktiert.

Halsschild deutlich länger als breit (22 : 19), hintere Seitenecken leicht gerundet, die Seiten im basalen Drittel parallel, dann leicht im Bogen verschmälert, Vorderrand mässig breit gerundet; Summit etwas vor der Mitte, dahinter mil leichtem Quereindruck, Apikalfläche dicht und fein geschuppt-gehöckert, Basalteil kräftig eingestochen punktiert, die Mittellinie punktfrei, im vorderen Drittel spärlich behaart. Schildchen mässig gross, glatt.

Flügeldecken so breit und nicht ganz 1.6 mal so lang wie der Halsschild, in den basalen zwei Dritteln parallelseitig, Hinterrand breit gerundet, Absturz deutlich hinter der Mitte beginnend, ziemlich steil schief gewölbt; Scheibe gestreift-punktiert, die Reihenpunkte kraftig und enggestellt, nach hinten nur wenig grösser werden, der Nahtstreifen viel krätiger eingedrückt als die übrigen, die Naht selbst eng und einreihig unregelmässig gekörnt, der 2., 4. und 6. Zwischenraum endet am Beginn der Absturzwölbung in ein feines Körnchen, Absturzfläche mit der Naht ganz leicht erhöht, im Raume des zweiten Zwischenraumes eingedrückt, der Hinterrand etwas kantig aufgebogen.

Type in Sammlung Schedl.

Fundort: Wahrscheinlich Java: Dapok.

XYLEBORICUS MALAYENSIS Schedl., masc. nov.

Männchen.—Gelbbraun (unausgefärbt), 1.7 mm lang, 2.4 mal so lang wie breit. Der allgemeinen Bauart nach dem Weibchen ähnlich, aber gedrungener und der Absturz flacher.

Stirn breit, leicht, gewölbt, unten abgeflacht, winzig punktuliert, zerstreut, sehr fein punktiert, die Punkte gegen die vorderen Seitenecken etwas gedrängter stehend, abgesehen von der nach unten gerichteten Haarfranse entlang des Vorderrandes nahezu nackt.

Halsschild länger als breit (23 : 21), hintere Seitenecken gerundet, die Seiten bis weit vor die Mitte subparallel, kurz vor den hinteren Seitenecken etwas eingebuchtet, Vorderrand breit gerundet, Scheibe der Länge nach sehr schwach gewölbt, mässig glänzend, ziemlich regelmässig mit feinen Pünktchen besetzt, die kurze abstehende Härchen tragen.

Flügeldecken so breit und etwas 1.2 mal so lang wie der Halsschild, bis zur Mitte parallelseitig, Hinterrand mässig breit gerundet, der Absturz beginnt bereits vor der Mitte und ist schief abgewölbt; Scheibe mit angedeuteten Punktreihen, die Zwischenräume leicht genetzt, auf dem Absturz mit denselben rillenförmigen Vertiefungen bezw. kielartigen Erhöhungen wie beim Weibchen.

Typen in Sammlung Schedl und Drescher.

Fundort: JAVA, Batoerraden, G. Slamet, April 10, 1930, ex pohon karet pertja, F. C. Drescher.

XYLEBORUS THEÆ Eggers, masc. nov.

Männchen.—Gelbbraun 1.3 mm lang, 2.2 mal so lang wie breit.

Stirn sehr breit, leicht gewölbt, ziemlich glänzend, auf winzig punktuliertem Grunde kaum wahrnehmbar punktiert. Die Augen sehr klein, die Mandibeln schlank und weit von einander entfernt eingelenkt.

Halsschild so lang wie breit, Basis gerade, hintere Seitenecken gerundet, die Seiten geradlinig und bis etwas vor die Mitte leicht divergierend, Apikalrand breit gerundet; Scheibe der Länge nach mässig gewölbt, ziemlich glatt und mit kaum erkennbaren Pünktchen. Schildchen klein.

Flügeldecken deutlich schmäler und 1.17 mal so lang wie der Halsschild, die Seiten im basalen Drittel parallel, hinten eiförmig gerundet, Absturz kurz hinter der Basis beginnend kräftig gewölbt, Scheibe in Reihen undeutlich punktiert, die Pünktchen auf dem Absturz etwas gedrängt. Der ganze Käfer nicht nennenswert behaart.

Type in Sammlung Schedl.

Fundort: JAVA, Buitenzorg, L. G. E. Kalshoven.

XYLEBORUS CIRCUMCISULUS sp. nov.

Weibchen.—Rotbraun, 1.9 mm lang, 2.8 mal so lang wie breit und kleiner und schlanker als *Xyleborus terreticollis* Schedl, die Absturzfläche lackglänzend, jederseits mit drei Reihen deutlicher Punkte.

Stirn breit, matt, winzig punktuliert, zerstreut fein punktiert, mit kaum wahrnehmbaren kurzen Härchen.

Halsschild länger als breit (23:20), zylindrisch, hintere Seitenecken kurz gerundet, die Seiten bis weit über die Mitte parallel, Vorderrand breit gerundet und mit einer Reihe von kleinen, gleichgrossen Schuppenhöckerchen bewehrt; Summit deutlich vor der Mitte, Apikalfläche gewölbt, dicht, sehr fein

geschuppt-gehöckert, Apikalfläche mattglänzend, winzig punktuliert und kaum merklich punktiert. Schildchen klein, glänzend.

Flügeldecken so breit und 1.5 mal so lang wie der Halsschild, vollkommen zylindrisch, Absturz steil geschnitten und rund herum scharfkantig begrenzt, Scheibe glänzend, die Punktreihen deutlich, die Punkte selbst aber klein und zum Teil versenkt, die Zwischenräume tragen kleinere, zerstreut liegende Pünktchen; Absturz lackglänzend, die Naht nach unten dachförmig erhöht, mit drei Punktreihen, von denen die erste kräftigere Punkte trägt als die übrigen.

Typen in Sammlung Schedl und Drescher.

Fundort: JAVA, Batoerraden, G. Slamet, April 10, 1930, ex pohon tembagan, April 10, 1930, ex *Eugenia lineata* Duthie (Myrataceæ), F. C. Drescher.

XYLEBORUS PERNITIDUS sp. nov.

Weibchen.—Ein sehr naher Verwandter, vielleicht nur eine Lokalform des *Xyleborus bræviusculus* Schedl von Malaya auf Java. Als wesentliche Unterschiede sind zu nennen: deutlich grösser, 1.7 mm lang, Halsschildoberrand etwas enger gerundet, Summit mehr der Basis genähert, die hinteren Seitenecken kräftiger gerundet, die Flügeldecken grösser skulptiert und der Absturz mit dem Quereindruck stärker betont.

Type in Sammlung Schedl.

Fundort: JAVA, Batoerraden, Juli 17, 1930, F. C. Drescher.

XYLEBORUS CYLINDRIPENNIS sp. nov.

Weibchen.—Rotbraun, 2.0 mm lang, 2.6 mal so lang wie breit. Mit *Xyleborus eucalypticus* Schedl näher verwandt, aber gedrungener gebaut, Flügeldeckenabsturz mehr abgeflächt gewölbt und die Punktreihen daselbst besser entwickelt.

Stirn breit, flach gewölbt, winzig punktuliert, vereinzelt punktiert, spärlich behaart, mit einer nach unten gerichteten Haarfranse entlang des Vorderrandes.

Halsschild kaum länger als breit (23 : 22), hintere Seitenecken rechtwinkelig und kaum gerundet, bis zur Mitte subparallel, Apikalrand breit gerundet; Summit etwas hinter der Mitte beginnend, vorne ziemlich steil gewölbt und sehr dicht fein geschuppt-gehöckert, Basalfläche mattglänzend und mit winzigen Pünktchen, Behaarung mässig spärlich, kurz und abstehend, eine Haarfranse entlang der Flügeldeckenbasis, die leicht aufgebogen erscheint und das Schildchen verdeckt.

Flügeldecken so breit und 1.5 mal so lang wie der Halsschild, in den basalen drei Fünfteln parallelseitig, Apex sehr breit gerundet, Absturz kurz steil gewölbt; Scheibe leicht gestreift-punktiert, die Punkte verhältnismässig klein und enggestellt, die Zwischenräume breit, leicht genetzt, mit je einer Reihe winziger, kaum wahrnehmbarer Pünktchen, die Reihenpunkte mit ganz kleinen anliegenden Härchen, die Zwischenraumpunkte mit längeren abstehenden Börstchen, Absturz mit der Naht ganz leicht erhöht, der zweite Zwischenraum kaum merklich eingedrückt, alle Zwischenräume mit je einer Reihe feiner setoser Körnchen anstelle der Punkte, so dass der ganze Absturz rauh erscheint.

Typen in Sammlung Schedl und Drescher.

Fundort: JAVA, Batoerraden, G. Slamet, April 10, 1930, ex pohon sarangan (*Castanea argentea* Bl.), F. C. Drescher.

XYLEBORUS ANDAMANENSIS Blandf., masc. nov.

Männchen.—Wenn ausgefärbt dunkelrotbraun, 1.5 bis 1.7 mm lang, gerade doppelt so lang wie breit.

Stirn bedeutend schmäler als der Halsschild, der Länge nach sehr wenig, der Breite nach etwas stärker gewölbt, glänzend poliert, mit feinen, etwas gedränge stehenden Pünktchen an den Seiten gegen die Augen und entlang des Vorderrandes, die seitlichen Punkte tragen lange, feine, abstehende Haare, jene am Vorderrand nach unten gerichtete Härchen.

Halsschild nahezu rechteckig und breiter als lang (21.8 : 15.0), hintere Seitenecken etwas stumpfwinkelig und wenig gerundet, die Seiten nach vorne nur schwach verschmälert und leicht ausgebaucht, die vorderen Seitenecken deutlich, der Vorderrand sehr breit gerundet; Scheibe aufsteigend gewölbt, ohne Buckel, stark glänzend, mit zerstreuten Pünktchen, die im vorderren Drittel in feine Körnchen übergehen, Punkte bezw. Körnchen mit langen abstehenden Haaren. Schildchen glänzend, breiter als lang.

Flügeldecken so breit und nicht ganz doppelt so lang wie der Halsschild, Seiten in den basalen zwei Fünfteln subparallel, dann kräftig bogig verengt, Hinterrand nur mässig breit gerundet, der Absturz beginnt bereits kurz hinter der Basis und ist schief flach gewölbt, im unteren Teil deutlich abgeflach; die kurze Scheibe unregelmässig mit flachen Punkten besetzt, so dass die Reihen nur schwer erkennbar sind, auf dem Absturz ist die Naht leicht erhöht, die Punktreihen sind etwas besser ausgeprägt, alle Zwischenräume mit locker stehenden Körnchen,

welche, wie die Punkte der Scheibe, lange abstehende Härchen tragen.

Typen in Sammlung Schedl und Drescher.

Fundort: JAVA, Batoerraden, G. Slamet, April 9 ,1930, ex pohon tontoman, F. C. Drescher.

XYLEBORUS SIOBANUS Eggers, masc. nov.

Männchen.—Rotbraun, 2.4 mm lang, 2.3 mal so lang wie breit. In der allgemeinen Form und Skulptierung vom Weibchen nicht allzu stark abweichend, doch blaube ich, dass die beiden Geschlechter zusammen gehören.

Stirn deutlich schmäler als der Halsschild, die Augen klein, zwischen denselben leicht gewölbt, gegen den Vorderrand abgeflacht, auf winzig punktuliertem Grunde unregelmässig punktiert, in der Mitte Andeutung einer Längsschwiele, vereinzelt behaart, längs des Vorderrandes die Härchen nach abwärts gerichtet.

Halsschild etwas breiter als lang, die vorderen und hinteren Seitenecken ausgebildet, die letzteren kräftig gerundet, die Seiten leicht geschwungen und nach vorne nur wenig verengt, Vorderrand breit gerundet; Scheibe gewölbt, Summit etwas hinter der Mitte, vorne mit verhältnismässig feinen Schuppenhökkerchen dicht besetzt, Basalfläche sehr zerstreut und fein punktiert, die Punkte bezw. Schuppen tragen lange feine Haare. Schildchen mässig gross und glänzend.

Flügeldecken so breit und 1.6 mal so lang wie der Halsschild, die Seiten in der basalen Hälfte subparallel, der Hinterrand breit und ganz leicht winkelig gerundet, der Absturz beginnt etwas hinter der Mitte und ist schief gewölbt; Scheibe gestreift-punktiert, die Streifen seicht und die Punkte verhältnismässig eng gestellt, die Zwischenräume mässig breit, mit je einer unregelmässigen Reihe von Punkten, die noch vor dem Absturz in Körnchen übergehen; Absturz mit der Naht leicht flackformig erhaben, der zweite Zwischenraum in der oberen Hälfte etwas eingedrückt, alle Zwischenräume, auch der zweite, mit je einer Reihe locker gestelleter feiner Körnchen, die Zwischenraumkörnchen bezw. Punkte tragen abstehende lange Härchen.

Type in Sammlung Schedl.

Fundort: JAVA, Batoerraden, G. Slamet, April 9, 1930, ex pohon dadap doerie, F. C. Drescher.

XYLEBORUS ASTUTUS sp. nov..

Weibchen.—Dunkelrotbraun, 2.4 mm lang, rund, dreimal so lang wie breit. Eine neue Art, die zweifellos in die Nähe der

Xylebori proceri zu stellen ist und die im indomalayischen Faunengebiet keinen näheren Verwandten besitzt und am ehesten moch in die Nachbarschaft von *Xyleborus tenuigraphus* Schedl zu stellen wäre.

Stirn breit, mässig gewölbt,, winzig punktuliert und lokker gross punktiert, diese Punkte tragen mässig lange Haare.

Halsschild deutlich länger als breit (26 : 22), die hinteren Seitenecken kurz gerundet, die Seiten bis gut über die Mitte parallel, vorne breit gerundet und mit Andeutung einer subapikalen Einschnürung, Summit in der Mitte, vorne mässig gewölbt, sehr fein und sehr dicht geraspelt-gehöckert, die lange Basalfläche glänzend und mit winzigen Pünktchen, längere Börstchen nur in der apikalen Hälfte.

Flügeldecken so breit und nahezu 1.6 mal so lang wie der Halsschild, zylindrisch, im letzten Drittel bogig verengt, der Apikalrand breit gerundet, der Absturz kurz, erst hinter der Mitte beginnend und schief abgewölbt; Scheibe mit Reihen feiner deutlicher Punkte, aber ohne streifige Anordnung, die Zwischenräume breit, glänzend und mit einigen wenigen winzigen Pünktchen, der erste Zwischenraum trägt von der Mitte an fünf locker gestellte Körnchen, die gegen den Absturz kräftiger werden und deren letztes am oberen Absturzrand liegt, ein ebensolches körnchen etwas höher am zweiten Zwischenraum und ein ebensolches etwas tiefer gelagert auf dem dritten; Absturz etwas abgeflacht, in der oberen Hälfte auf dem zweiten Zwischenraum ein starker Höcker, ein kleines Körnchen kurz vor dem Hinterrand, welcher bis zum 7. Zwischenraum kantig ausgeprägt ist, die erste und zweite Punktreihe angedeutet, einige längere Börstchen entspringen auf den Körnchen der seitlichen und oberen Begrenzung.

Type in Sammlung Schedl.

Fundort: Java.

XYLEBORUS SEREINUS Eggers, masc. nov.

Männchen.—Gelbbraun, von der allgemeinen Form des *Xyleborus dispar* F., 1.5 bis 1.9 mm lang, ungefähr doppelt so lang als breit.

Stirn glänzend poliert, sehr fein punktiert und mit einigen langen gelben Haaren.

Halsschild von oben gesehen viel breiter als lang (19 : 10), schief von vorne betrachtet ungefähr so lang wie breit, die Basis leicht gebogen, die hinteren Seitenecken stark gerundet, die Seiten in der basalen Hälfte leicht bogig verengt, Apex

für sich und breit gerundet; Scheibe leicht gewölbt, glänzend und mit einigen winzigen Punktchen, von denen lange abstehende Haare entspringen. Schildchen klein, glänzend.

Flügeldecken deutlich breiter (22 : 19) und etwas mehr als doppelt so lang wie der Halsschild, eiförmig im Umriss, am Ende des basalen Drittels am breitesten, Apex eng gerundet, von kurz nach der Basis an abgewölbt, glänzend, dicht punktiert, aber die Punktreihen undeutlich. Behaarung spärlich, aber lang.

Type in Sammlung Schedl.

Fundort: JAVA, Batoerraden, G. Slamet, April 10, 1930, ex pohon belis, F. C. Drescher.

PLATYPUS NITIDULUS sp. nov.

Männchen.—Dunkelrotbraun, stark glänzend, 3.4 mm lang, 2.6 mal so lang wie breit. Mit *Platypus nitens* Chap. näher verwandt und mit diesen bisher wohl auch verwechselt worden. *Platypus nitidulus* ist im Vergleich zu *Platypus nitens* etwas gedrungener, der Absturz kräftiger gewölbt und die Punktstreifen auf der oberen Absturzwölbung kaum streifig vertieft.

Stirn breit, abgeflacht, in der Mitte zwischen den Fühlereinlenkungen mit einem kurzen Längskielchen, im übrigen runzelig bis netzartig punktiert und spärlich absthend behaart.

Halsschild etwas breiter als lang, kurz hinter dem Vorderrand am breitesten, Schenkelgruben kurz und tief, Mittellinie ebenfalls sehr kurz; Oberfläche mässig glänzend, unregelmässig locker mit flachen Pünktchen besetzt, die beiderseits etwas vor der Mittellinie gehäuft auftreten und abstehende Härchen tragen.

Flügeldecken wenig breiter, und 1.8 mal so lang wie der Halsschild, die Seiten bis zur Mitte parallel, dann ganz leicht und schief verengt. Apikalrand wie bei *Platypus nitens* breit ausgeschnitten und jederseits mit einem nach unten gerichteten Zähnchen bewehrt, gestreift-punktiert, die Punkte verhältnismässig locker gestellt, die Streifen auf der Absturzwölbung regelmässiger und etwas tiefer, sowie die Punkte etwas grösser, gegen die hinteren Seitenecken die Streifen verschwindend und glänzend poliert.

Weibchen.—Von ähnlicher Grösse und nahezu denselben Proportionen wie das Männchen.

Stirn abgeflacht, mit medianem Längsgrübchen und kräftig dicht punktiert und abstehend behaart.

Halsschild ähnlich wie beim Männchen, doch die Schenkelgruben etwas weniger tief, die Punktierung der Scheibe locker und feiner.

Flügeldecken etwas breiter als der Halsschild, der Apikalrand nicht halbkreisförmig ausgeschnitten, die Absturzwölbung kräftiger und gleichförmig, die Punktstreifen weniger vertieft und die Zwischenräume mit recht gut erkennbaren Pünktchen, besonders in der Nähe der Basis und auf der Absturzwölbung, eine senkrechte Apikalfläche lediglich angedeutet.

Typen in Sammlung Schedl.

Fundort: JAVA, Mt. Gédé, 800 m, August, 1933, Dapos, Saninten, Pl. 460, L. G. E. Kalshoven.

PLATYPUS SALTATORINUS sp. nov.

Weibchen.—Rotbraun, Flügeldecken zum Gross teil strohgelb, 3.4 mm lang, zirka viermal so lang wie breit. Mit *Platypus saltator* von den Philippinen näher verwandt, doch wesentlich grösser, schlanker und mit anderer Absturzbewehrung.

Stirn abgeflacht, mattglänzend, locker und flach punktiert, mit länglichem Mediangrübchen, die kleinen Pünktchen tragen kurze, abstehende Haare.

Halsschild länger als breit (30 : 24), an der vorderen Begrenzung der seitlichen Schenkelgruben am breitesten, von dort nach vorne die Seiten subparallel, die Schenkelgruben mässig tief und lang; Scheibe glänzend, gegen die vorderen Seitenecken winzig chragniert und mit feinen, aber etwas ungleich grössen Pünktchen besetzt, die vertieften Mittellninie auf das basale Drittel beschränkt.

Flügeldecken wenig breiter und gut doppelt so lang wie der Halsschild, parallelseitig, im letzten Drittel leicht bogig verengt, Apikalkante quer, an der Naht ganz leicht vorgezogen und die hinteren Seitenecken zu einem spitzen, nach abwärts gebogenen Zähnchen entwickelt; Scheibe matt, weil fein chragniert, fein gestreift-punktiert, die Streifen selbst sehr flach und die Reihenpunkte klein, Absturzwölbung auf das apikale Viertel beschränkt, hier die Streifen kräftiger vertieft, die Punkte undeutlich, die Zwischenräume etwas rauh und mit winzigen Körnchen, welche kurze, gelbe Härchen tragen, bedeckt.

Typen in Sammlung Schedl und Kalshoven.

Fundort: JAVA, Mt. Gédé, 800 m, November, 1924, d 194 b, L. G. E. Kalshoven.

Ein weiters Stück in meiner Sammlung, ebenfalls von Java, könnte das Männchen sein. Bei demselben sind die Zwischen-

räume auf der Absturzwölbung deutlich gekielt, enger und die hinteren Seitenfortsätze sind wesentlich länger und stärker nach abwärts gebogen.

PLATYPUS STRIGILLATUS Schedl, fem. nov.

Weibchen.—Rotbraun, 3.4 mm lang, viermal so lang wie breit.

Stirn glänzend, abgeflacht, in der oberen Hälfte ziemlich gross punktiert, die Punkte abstehende Harchen tragend.

Halsschild deutlich länger als Breit, Schenkelgruben kurz und tief, an beiden Enden winkelig begrenzt, Scheibe stark glänzend, Mittellinie lang, die Punktierung spärlich, die Punkte ungleich gross, aber im allgemeinen fein.

Flügeldecken kaum breiter und 2.2 mal so lang wie der Halsschild, in den basalen drei Vierteln parallel, hinten ganz wenig bogig verengt, Apikalrand quer, schief von hinten gesehen leicht breit ausgeschnitten; Scheibe in Reihen fein punktiert, die erste Reihe in einem sehr feinen, vertieften Streifen liegend, bei den anderen eine solche Bildung nicht vorhanden, Zwischenräume eben, nahezu unpunktiert; der Absturz ganz kurz, oben etwas schief gewölbt und dann senkrecht abbrechend, auf der oberen Absturwölbung die Reihen in vertieften Streifen, die Zwischenräume mit feinen setosen Pünktchen, senkrechte Absturzflache matt, jederseits der Naht leicht eingedrückt, der Apikalrand auf jeder Seite dreieckig verlängert.

Type in Sammlung Schedl.

Fundort: Mt. Gédé, November, 1924, Nr. d 194, Pl. 26a, L. G. E. Kalshoven.

DIAPUS MINOR sp. nov.

Männchen.—Gelbbraun, seidenglänzend, 1.7 mm lang, 3.5 mal so lang wie breit. Eine der kleinsten Arten der Gattung und mit *Diapus pusillimus* Chap. näher verwandt, für welchen er bisher gehalten wurde. Als ünterschied kommen in erster Linie die feingekielten Zwischenräume im apikalen Drittel der Flügeldecken in Frage.

Stirn abgeflacht, winzig chragniert und zerstreut punktiert, auf dem Scheitel mit einigen längeren Härchen und gut ausgeprägtem Mittelkiel.

Halsschild lackglänzend, etwas länger als breit, mit kräftigen seitlichen Schenkelgruben; Scheibe sehr zerstreut punktiert und punktuliert gegen die vorderen Seitenecken, Mittellinie bis über die Hälfte deutlich ausgeprägt, entlang der Basis mit einer mondsichelartigen, winzig punktulierten, in der Farbe helleren Abgrenzung.

Flügeldecken doppelt so lang als breit, die Basis fein gekantet aufgebogen, in der Mitte am Schildchen durch einen tiefen Einschnitt unterbrochen, die Seiten nur leicht geschwungen, subparallel, von der Mitte an ganz leicht schief verengt, Apikalkante nahezu quer, mit gut ausgeprägten Seitenecken; Scheibe punktuliert, die Punktstreifen nur nahe der Basis und gegen das Flügeldeckenende angedeutet, die Punkte selbst nicht sichtbar, diese Streifen gegen das Flügeldeckenende stark vertieft, so dass die Zwischenräume leicht kielartig hervorstehen, die geraden Zwischenräume etwas verkürzt, Apikalrand nahe der Naht etwas winkelig vorgezogen und am unteren Ende in Verlängerung des 9. Zwischenraumes mit einen feinen Zähnchen, die Apikalkante senkrecht, breit und leicht konkav. Abdomen ausgehöhlt.

Type in Sammlung Schedl.

Fundort: JAVA, Mt. Gédé, 800 m, November, 1924, Nr. d 141 j, L. G. E. Kalshoven.

THE PHILIPPINE DIPLAZONINÆ (HYMENOPTERA, ICHNEUMONIDÆ)

By CLARE R. BALTAZAR
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ONE PLATE

There has been no record of this group of ichneumon flies in the Philippines, although recent collecting in the higher mountains indicates that the insects are rather common above 2,000 meters. Nine species belonging to five genera are reported in the present paper. Eight of the species appear to be new. The ninth is the cosmopolitan *Diplazon lætatorius*. The specimens studied are largely in the collection of Drs. Henry and Marjorie Townes, of North Carolina State College, and all types are in that collection. The others are in the collections of the Bureau of Plant Industry at Manila, the U. S. National Museum at Washington, D.C., and the College of Agriculture at Los Baños.

The generic synonyms and type designations are copied from Muesebeck, Krombein, and Townes.*

The writer is grateful to Dr. Henry Townes for loaning specimens and for the guidance, supervision, and help extended, without which this work could not have been done. Sincere thanks are also due Miss Luella Walkley for loaning the Philippine diplazonine collection at the United States National Museum.

Subfamily DIPLAZONINAE

The members of this subfamily are parasites of Syrphidæ. The specimens studied were collected mostly at relatively high altitudes. One species, *Diplazon lætatorius*, is world-wide in distribution and can be collected both in the lowlands and in the uplands.

The structural character that best distinguishes the Diplazoninæ from other subfamilies of ichneumon flies is the presence of three apparent teeth on the mandible. The appearance of three mandibular teeth is achieved by the subdivision of the dorsal tooth, which has a weak or distinct notch in its broad apical margin. The rest of the ichneumon flies, with rare

* Muesebeck, C. F. W., Karl V. Krombein, and Henry K. Townes. Hymenoptera of America. North of Mexico. Synoptic catalog. U. S. D. A. Agriculture monograph no. 2 (1951).

exceptions, have only two teeth or sometimes one. Face elevated at center, not flat; clypeus narrow, its apex more or less bilobed; annelus distinct; notaulus present or absent; areolet present or absent, if present pointed and often petiolate above; propodeum either smooth, indistinctly carinate, or strongly carinate; abdomen depressed; first abdominal tergite rectangular, its spiracle at about the basal third; ovipositor short, not longer than the depth of the last abdominal segment.

They are generally small black species with bright yellow and often also ferruginous markings, ranging from 5 to 10 millimeters long. The antenna is black, without a white band.

Key to the Philippine genera of Diplazoninæ

1. Second and third tergites with a postmedian transverse groove; areolet absent; propodeum with strong carinæ; notaulus present. ..... 4. *Diplazon*

   Second and third tergites without a postmedian transverse groove; areolet present or absent; propodeum with or without carinæ; notaulus present or absent 2

2. Second tergite with a pair of convergent median basal carinæ; first tergite wide, about 1.25 to 1.3 as long as basal width .... 2. *Enizemum*

   Second tergite without a pair of median basal carinæ; first tergite narrow, about 2.0 to 2.25 as long as basal width 3

3. Notaulus present; propodeum with sharp carinæ; face polished; areolet absent ..... 5. *Promethes*

   Notaulus absent; propodeum usually without distinct carinæ; face mat; areolet present or absent 4

4. Scutellum black (in the Philippine species); clypeus without median longitudinal groove; areolet present (in the Philippine species); propodeum weakly rugose, with indistinct carinæ; flagellum in male with tyloids ..... 1. *Syrphoctonus*

   Scutellum yellow (in the Philippine species); clypeus with a faint median longitudinal groove; areolet absent; propodeum smooth, with microreticulations; flagellum in male without tyloids .... 3. *Homoporus*

1. Genus SYRPHOCTONUS Foerster

Syrphoctonus FOERSTER Naturh. Ver. Rheinlande Verh. 25 (1868) 162.

Type: *Bassus biguttatus* Gravenhorst. Designated by Viereck, 1912.

This genus is similar to *Homoporus* in that the propodeum is without distinct carinæ, notaulus absent, and face mat. It may be distinguished, however, by the following characters: clypeus without a median longitudinal groove; areolet present (in the Philippine species) or absent; flagellum in male with tyloids; propodeum often somewhat rugose. Scutellum black in the Philippine species (yellow in the Philippine *Homoporus*).

First tergite narrow, about twice to 2.25 as long as wide; second and third tergites without a transverse groove; "pleura" of last tergite in male separate.

Key to the Philippine species of Syrphoctonus

Hind coxa mostly yellow, blackish at base; face black with yellow sides in male, entirely black in female; areolet without stalk; second transverse cubital weak ..... *varianus* sp. nov.

Hind coxa entirely black; face entirely yellow in male (female unknown); areolet with a short stalk; second transverse cubital strong. *nigricoxus* sp. nov.

SYRPHOCTONUS VARIANUS sp. nov. **Plate 1, fig.. 1.**

Female.—Forewing about 4.4 mm long. Head mat, matting coarsest on face, frons inconspicuously mat and shiny; hair scattered over entire head, very fine and hardly visible on frons; clypeus impressed at base, emargination shallow; malar space about 1.2 as long as basal width of mandible; antenna with 23 segments, sensory areas present, last segment about twice as long as wide, about twice as long as preceding. Mesoscutum with rough area on anterior fourth, behind punctured and somewhat indistinctly microreticulate; notaulus absent; propodeum rugose, carinæ indistinct, area above attachment of petiole smooth and polished; side of pronotum rugose, mesopleurum microreticulate except for shiny and smooth upper hind quadrant and mesepimeron; metapleurum microreticulate; midsternal groove deep. Areolet present; second transverse cubital weak; nervellus broken at lower 0.3 to 0.4. Tergites shiny; first tergite coarsely mat, about twice as long as wide, its two longitudinal carinæ not very sharp, with a median depression between carinæ on posterior half; second tergite with longitudinal striæ divergent on basal half, its posterior half microreticulate; tergites 3 to 8 with finer microreticulations than those on second tergite.

Black with yellow markings on abdomen. Clypeus except black base, mandible except teeth, palpi, a transverse spot on shoulder, posterior tip of pronotum, tegula, base of costa, and posterior half of subalar elevation of mesopleurum yellow; mandibular teeth, antenna, stigma except pale base, and veins fuscous; fore leg with coxa and trochanters yellow, femur and tibia yellowish brown, tarsus brown; middle leg with coxa and trochanters yellow, femur and basal 0.6 of tibia yellowish brown, distal third of tibia and tarsus brown; hind leg with

coxa mostly yellow, suffused with black at base, first trochanter mostly fuscous, yellowish at apex, second trochanter yellow, femur mostly ferruginous, blackish at base and external side, tibia yellowish brown except for fuscous markings at base, a spot on external side at basal fourth, distal third of tibia, spurs, and tarsus fuscous; first and second tergites black, the rest fuscous to brownish with yellowish markings as follows: two transverse subtriangular spots on basal third of the third tergite, sometimes spots confluent or almost confluent at center; marginal bands on basal fifth of fourth tergite, in some specimens yellow bands also on the fifth and sixth tergites, bands may be notched at center; sternites 1 to 4 yellow, beyond fourth sternite brown.

Male.—Forewing about 4.4 mm long. Similar to the female in sculpture but differs in color as follows: face not entirely black but with yellow sides, some specimens with a subcircular yellow spot at center of face, black margin of face either diagonally straight or sinuate or deeply notched; ventral side of scape and pedicel brownish; subalar elevation of mesopleurum entirely yellow; tergites with yellow markings as in female but most often bands only on the third and fourth tergites, at times also on the fifth.

Antenna with 23 or 24 segments, tyloids present on segments 9 to 15 or 10 to 15.

Type.—Female, Mount Santo Tomas, Mountain Province, 7,300 feet, April 3, 1953, H., M., and D. Townes (Townes).

Paratypes.—From the same locality as type, 6,500 to 7,300 feet: 75 males and 20 females, April and June, 1952, November and December, 1953, H., M., and D. Townes (Townes, Bureau of Plant Industry at Manila; College of Agriculture at Los Baños, and U. S. National Museum); 16 males and 2 females, November 28 and 29, 1953, H. Townes (Townes); 8 males, November 28 and 29, 1953, C. R. Baltazar (Bureau of Plant Industry at Manila); 7 males and 1 female, November 28 and 29, 1953, A. Marmeto (Bureau of Plant Industry at Manila); 2 males and 2 females, Mount Data, Mountain Province, 7,800 feet, December, 1952, and January, 1953, H., M., and D. Townes (Townes); 9 males and 3 females, Dapitan, Zamboanga, Baker (U. S. National Museum, Townes, and Bureau of Plant Industry at Manila); male, Baguio, Mountain Province, Baker (U. S. National Museum).

SYRPHOCTONUS NIGRICOXUS sp. nov. **Plate 1, fig. 2.**

Male.—Forewing about 4.2 mm long. Entire head mat, matting finest on vertex and temple, clypeus impressed from above the middle to the base, its apical emargination shallow; malar space about 1.2 as long as basal width of mandible; antenna with 23 segments, last segment about twice as long as wide, almost as long as preceding, tyloids present on segments 9 to 16. Mesoscutum shiny and irregularly punctured, punctures closer on the anterior fifth of mesoscutum, the interspaces there about the same to twice diameter of punctures, the rest of mesoscutum with the punctures farther apart, the interspaces about three to four times diameter of punctures; propodeum rugose, with carinæ indistinct; side of pronotum somewhat rugose; mesopleurum shiny and shallowly punctate, the interspaces about three to four times diameter of punctures, impunctate on upper hind quadrant, mesepimeron smooth and shiny; metapleurum rugose; midsternal groove deep. Areolet present and with a short stalk; nervellus broken at its lower third. First tergite rugoso-mat, about twice as long as wide, longitudinal carinæ absent; second tergite rugoso-mat with a subcircular depressed area on basal corner, with longitudinal striæ between and behind depressed areas; third and following tergites entirely mat.

Black with yellow bands on tergites. Face, clypeus, mandible except teeth, malar space, spot on ventral side of scape, transverse spot on shoulder, posterior tip of pronotum, tegula, subalar elevation of mesopleurum, base of costa, and two spots on hind margin of prosternum yellow; mandibular teeth, stigma except pale base, and veins fuscous; fore and middle legs mostly yellow, with brownish streak on dorsal side of femur and tibia, tarsus brown; hind leg blackish, trochanters, both ends of femur, and basal 0.6 of tibia yellow; spot on proximal third of tibia, distal 0.4 of tibia, and spurs fuscous; tergites black except for yellow transverse bands on basal third of tergite 3, and basal margins of tergites 4 and 5; sternites yellow.

Female.—Unknown.

Type.—Male, Mount Santo Tomas, Mountain Province, 7,300 feet, April 3, 1953, H., M., and D. Townes (Townes).

2. Genus ENIZEMUM Foerster

Enizemum FOERSTER, Naturh. Ver. Rheinlande Verh. 25 (1868) 162. Type: (*Bassus tibialis* Cresson) = (*Pimpla*) *petiolatum* (Say). Included by Davis, 1895.

Homotropus FOERSTER, Naturh. Ver. Rheinlande Verh. 25 (1868) 162. Type: (*Bassus bicapillaris* Walsh) = (*Pimpla*) *petiolatum* (Say). Designated by Viereck, 1912.

This genus is distinguished from the rest of the genera by the following characters: first tergite wide, about 1.25 to 1.3 as long as wide; second tergite with a pair of convergent median basal carinæ.

Face mat; flagellum in male with tyloids; notaulus absent; areolet present; propodeum with carinæ enclosing areola distinct; second and third tergites without a transverse groove; "pleura" of last tergite in male separate.

The only species of *Enizemum* described here is the largest diplazonine in the Philippines.

ENIZEMUM TOWNESÆ sp. nov. **Plate 1, fig. 7.**

Female.—Forewing about 8.0 mm long. Head mat; face coarsely mat; clypeus mat, flat, apical margin truncate with a median notch; malar space subequal to basal width of mandible; antenna with 23 segments, last segment about twice as long as wide, about twice as long as preceding. Mesoscutum densely punctate, interspaces subequal to diameter of punctures; notaulus absent; propodeum with carinæ enclosing areola distinct, apical carinæ not as sharp, apical area below areola with irregular longitudinal striæ, propodeum rugoso-punctate, basal area with punctures very close, the interspaces about half diameter of punctures; pleura punctured except a subtriangular area on the upper posterior half of mesopleurum, punctures somewhat larger and deeper than those on scutum, interspaces about 1.0 to 1.5 diameter of punctures; hind coxa punctate, the punctures shallow and smaller than those on pleura. Areolet present and with a stalk, not apically closed; nervellus broken above center at upper 0.45. First tergite about 1.25 as long as wide, rugoso-punctate, its two longitudinal carinæ sharp; second tergite about 0.6 as long as wide with subcircular depression at basal corner, basal median carinæ somewhat converging, becoming obsolete at distal third of tergite; third tergite rugoso-punctate, with longitudinal striæ at basal fifth, striæ longer at center; fourth tergite with punctures, close, interspaces about as wide as diameter of punctures, apical fifth microreticulate with few scattered punctures; fifth tergite microreticulate with very few scattered small punctures; sixth and seventh tergites similar to the fifth in sculpture.

Black. Face (except dark linear margin and upper rectangular dark spot), clypeus on basal fourth, mandible except teeth, scape on ventral side, transverse spot on shoulder, posterior tip of pronotum, subalar elevation of mesopleurum, mesepimeron, hind margin and central third of both scutellum and metanotum yellow; palpi, mandibular teeth, and border of mandible brown; clypeus except base, tegula, stigma except pale base, and veins fuscous; fore and middle legs mostly yellow except blackish ventral side of coxa, beyond femur light brown, last tarsal segment dark; hind leg black except yellow trochanters and basal third of tibia, base of femur yellowish brown; sternites 2 to 5 brown.

Male.—Forewing about 6.0 mm long. Similar to the female except as follows: face and malar space yellow (malar space partly black in one specimen); antenna with 22 segments, tyloids present on segments 9 to 15; tergites 2 to 3 with a postmedian transverse impression.

Type.—Female, Mount Santo Tomas, Mountain Province, 6,500 feet, December 27, 1952, H., M., and D. Townes (Townes).

Paratypes.—Same locality as type, 2 males, April 4, 1952, H., M., and D. Townes (Townes); male and female, 6,500 to 7,300 feet, November 28 and 29, 1953, C. R. Baltazar (Bureau of Plant Industry at Manila).

The types were collected from the foliage of scrubby oak trees (*Quercus* sp.).

The name is in honor of Dr. Marjorie C. Townes, who with her husband, has collected many Philippine Ichneumonidæ.

3. Genus HOMOPORUS Thomson

Homoporus THOMSON, Opusc. Ent., fasc. 16 (1890) 1488. Preoccupied. Type: *Homotropus elegans* Gravenhorst. Selected automatically Viereck, 1912, when he selected the species as the genotype of *Homocidus.*

Homocidus MORLEY, Brit. Ichn. 4 (1911) 87. New name for *Homoporus.*

Similar to *Syrphoctonus.* The characters that separate this genus from the rest are the following: propodeum smooth with microreticulations; clypeus with a faint median longitudinal groove; flagellum in male without tyloids.

Face mat; notaulus absent; areolet absent; first tergite narrow, about twice as long as wide, second and third tergites without a transverse groove; "pleura" of last tergite in male separate.

Key to the Philippine species of Homoporus

Nervellus straight, not broken; tegula yellow; first tergite black on basal half, distal half yellow; face entirely black (female unknown). *uichancoi* sp. nov.

Nervellus broken below the middle; tegula black; first tergite entirely black; face yellow with sides black (male unknown) .... *otanesi* sp. nov.

HOMOPORUS UICHANCOI sp. nov. **Plate 1, fig. 3.**

Male.—Forewing about 4.9 mm long. Entire head mat; clypeus impressed to the base, apical margin subtruncate and emarginate, median longitudinal groove impressed to about half the length of clypeus; malar space about 1.2 basal width of mandible; antenna with 25 segments, last segment as long as wide, as long as preceding. Mesoscutum finely mat, with irregularly scattered minute punctures; notaulus absent; propodeum smooth, without distinct carinæ, except for two short longitudinal carinæ confined to apical fifth, propodeum mat, the matting coarser than on pleura, with two small semicircular polished areas at apex; pleura almost entirely mat with minute punctures on ventral half, the interspaces about three to four times diameter of punctures; midsternal groove shallow. Areolet absent; nervellus straight, not broken. Tergites microreticulate, first tergite about twice as long as wide, two longitudinal carinæ absent, second tergite with longitudinal striæ on basal third.

Black with yellow bands on tergites. Antenna except for yellowish streak on the ventral side of the first nine segments, mandibular teeth, stigma except pale base, and veins fuscous; face, malar space, temple on ventral third, mandible except teeth, palpi, a transverse subtriangular spot on shoulder, scutellum, transverse band on central third of metanotum, posterior margin and posterior tip of pronotum, subalar elevation of mesopleurum, tegula, base of costa, prepectus, anterior half of mesosternum, basal spot on mesopleurum above attachment of middle coxa, and mesepimeron yellow; fore and middle legs mostly yellow, brown externally, tarsus brown; hind leg with coxa black, trochanters, basal third of tibia, and spurs yellow, femur except for yellowish base, tibia except basal third, and tarsus fuscous; tergites 1 to 5 yellow on basal half, black on apical half; tergites 6 to 8 black; sternites yellow.

Female.—Unknown.

Type.—Male, Mount Santo Tomas, Mountain Province, 7,300 feet, April 3, 1953, H., M., and D. Townes (Townes).

The name is in honor of Dean L. B. Uichanco, Professor of Entomology at the College of Agriculture, University of the Philippines, Los Baños, Laguna.

HOMOPORUS OTANESI sp. nov. **Plate 1, fig. 4.**

Female.—Forewing about 5.4 mm long. Entire head mat; clypeus impressed to the base, apical margin subtruncate, emarginate, with the median longitudinal groove impressed to about one-third the length of clypeus; malar space subequal to basal width of mandible; antenna with 22 segments, last segment about twice as long as wide, about twice as long as preceding. Mesoscutum smooth and microreticulate; scutellum and metanotum mat; scutellum with minute scattered punctures; notaulus absent; propodeum mat, matting coarser than on face, practically without carinæ except for two short longitudinal carinæ on apical third; side of pronotum mat; ventral half of mesopleurum microreticulate; metapleurum and dorsal half of mesopleurum smooth and shiny. Areolet absent, nervellus broken at its lower 0.4. Tergites microreticulate, reticulations coarsest on first tergite; first tergite about twice as long as wide, its longitudinal carinæ absent.

Black with yellow bands on tergites. Elevated central area of face and extensions to ventral corners, clypeus, mandible except teeth, palpi except tips, spot on shoulder, scutellum, posterior tip of pronotum, subalar elevation of mesopleurum, base of costa, small spot on dorsal tip of prepectus, ventral spot on mesopleurum, and mesepimeron yellow; mandibular teeth, tips of palpi, stigma except pale base, and veins fuscous; fore and middle legs similarly colored, their coxæ and trochanters yellow, femora and tibiæ ferruginous, and tarsi brown; hind leg with coxa black, first trochanter brown with yellowish streak dorsally, second trochanter, femur, and basal 0.6 of tibia ferruginous, distal 0.4 of tibia, and tarsus fuscous; tergites black with apical margins yellow, bands widening at sides, interrupted at center on tergites 5 and 6; sternites fuscous except first sternite which is yellowish.

Male.—Unknown.

Type.—Female, Mount Data, Mountain Province, 7,800 feet, January 1, 1953, Townes family (Townes).

The name is in honor of Mr. F. Q. Otanes, Chief Entomologist, Bureau of Plant Industry, Manila.

4. Genus DIPLAZON Nees

Bassus of authors, not of the genotype.
Diplazon NEES, Acad. Nat. Curios Nov. Acta 9 (1818) 292. Type: *Ichneumon laetatorius* Fabricius. Designated by Viereck, 1914.

This genus is readily separable from the other genera of Diplazoninæ by the presence of a sharp postmedian transverse groove on the second and third tergites.

Face mat; clypeus impressed from the base; notaulus present; areolet absent; propodeum with strong carinæ; first tergite wide, about 1.3 to 1.5 as long as wide; "pleura" of last tergite in male fused with the dorsal sclerite.

Key to the Philippine species of Diplazon

1. Tergites orange-brown on the first three or four or on the second and third tergites only, the rest black; second and third tergites with coarse punctures, not striate; hind tibia tricolorous: dark brown, yellow, and orange-brown ..... *laetatorius* (Fabricius)
   Tergites black; second and third tergites with longitudinal striæ; hind tibia bicolorous: dark brown and yellow 2
2. Mesoscutum black; male with face black except yellow sides, antenna black with scape and pedicel yellow ventrally, black dorsally; female with face and antenna entirely black ..... *luzonensis* sp. nov.
   Mesoscutum black with a yellow spot on shoulder; female with face black except for yellow sides; antenna entirely black (male unknown) ..... *visayensis* sp. nov.

DIPLAZON LUZONENSIS sp. nov. **Plate 1, fig. 5.**

Female.—Forewing about 4.6 mm long. Face mat with few scattered punctures; clypeus polished, microreticulate, flat, apical margin subtruncate, weakly emarginate; malar space mat, equal to basal width of mandible; temple mat on ventral fourth, the rest polished; vertex polished; entire head with scattered fine hairs; antenna with 19 segments, last segment about twice as long as wide, about twice as long as preceding. Mesoscutum shiny with very minute punctures, interspaces about three to four times diameter of punctures; notaulus impressed to about one-fifth length of mesoscutum; propodeum strongly carinate, areola closed, apical area large, occupying more than half the length of the propodeum, with longitudinal wrinkling at center, polished at the side of wrinkling, rugose on the side; pleura shiny, with punctations scattered and finer than on mesoscutum; midsternal groove shallow. Areolet absent; nervellus broken at its lower third. Tergites 1 to 3 with a post-median transverse groove; first tergites about 1.3 as long as wide, roughly sculptured, rugose before the groove, longitudinally striate at the groove, smooth behind groove; its

two longitudinal carinæ sharp, delimited apically by the transverse groove; second tergite as long as wide, with longitudinal striæ before the groove, smooth behind groove; third tergite similar to second; fourth tergite with transverse groove on basal third faint (absent in some specimens), coarsely punctate on basal third, the rest smooth; tergites 5 to 7 shiny, with microreticulations, reticulation more distinct on sides and on sternites.

Black. Antenna, mandibular teeth, stigma except pale base, veins, and ovipositor sheath fuscous; clypeus, mandible except teeth, palpi, scutellum, central transverse band on posterior half of metanotum, tegula, axillaries, base of costa, posterior tip of pronotum, and subalar elevation of mesopleurum yellow; fore and middle legs mostly yellow, becoming fulvous beyond femur; hind leg yellow with base and apical third of tibia, spurs, and tarsus fuscous.

Male.—Forewing about 4.0 mm long. Similar to the female except as follows: face mostly black with sides yellow, the yellow mark extending to malar space; ventral side of scape and pedicel yellow; antenna with 20 segments, last segment as long as wide, subequal to preceding. In female, face entirely yellow, malar space black, and antenna entirely black with 19 segments.

Type.—Female, Mount Santo Tomas, Mountain Province, 7,300 feet, December 27, 1952, H., M., and D. Townes (Townes).

Paratypes.—All from the same locality as type, 6,500 to 7,300 feet; 4 males and 4 females, April, November, and December, 1952, H., M., and D. Townes (Townes, U. S. National Museum, Bureau of Plant Industry at Manila, and College of Agriculture at Los Baños); 3 females, November 29, 1953, H. Townes (Townes); male and female, November 28 and 29, 1953, C. R. Baltazar (Bureau of Plant Industry at Manila).

DIPLAZON VISAYENSIS sp. nov. **Plate 1, fig. 6.**

Female.—Forewing about 4.2 mm long. Similar to *D. luzonensis* in sculpture and vestiture except for the following: malar space about 0.8 basal width of mandible; antenna with 18 segments, midsternal groove deep.

Black. Main color differences with *D. luzonensis* are stated in the key. Mandibular teeth, antenna, stigma except pale base, veins, sternites, and ovipositor sheath fuscous; side of face reaching to middle of eye, clypeus, mandible except teeth, palpi, scutellum, central transverse band on posterior half of metanotum, tegula, axillaries, base of costa, posterior tip of pronotum, and subalar elevation of mesopleurum yellow; fore and middle legs mostly yellow, beyond femur yellowish

brown, last tarsal segment dark brown; hind leg yellow, with base and apical third of tibia, spurs, and tarsus fuscous, yellowish brown at the joint of second trochanter and femur.

Male.—Unknown.

Type.—Female, Mount Canlaon, Negros Oriental, 7,000 feet, May 4, 1953, H., M., and D. Townes (Townes).

DIPLAZON LÆTATORIUS (Fabricius).

Female.—Forewing about 4.0 mm long. Face mat with punctures denser and larger than in *D. luzonensis,* interspaces about 1.5 to twice diameter of punctures; clypeus polished, apical margin truncate and emarginate; malar space mat, about 0.7 basal width of mandible; temple mat on ventral fourth, the rest polished; vertex polished; entire head with scattered fine hairs; antenna with 18 segments, last segment about twice as long as wide, about twice as long as preceding. Thorax dorsally polished and punctate, interspaces about one to two times the diameter of punctures; notaulus impressed to about half the length of mesoscutum; propodeum strongly carinate, median and apical carinæ present; areola closed, hind margin widely V-shaped; dorsal face of propodeum with coarse punctures, interspaces about 0.3 to 0.5 diameter of punctures, posterior face with irregularly oblique striæ except for median lateral areas which are rugose; pleura polished and punctate except mid-posterior area of mesopleurum which is impunctate, interspaces about two to three times diameter of punctures. Tergites 1 to 3 with a postmedian transverse groove; first tergite about 1.3 as long as wide, rugoso-punctate, before the groove the interspaces about 0.2 to 0.5 diameter of punctures, behind the groove punctures smaller, interspaces about two to three times the diameter of punctures, its two longitudinal carinæ sharp, delimited apically by the transverse groove; second and third tergites similarly sculptured as the first except for the smooth and polished distal margin; fourth tergite with transverse groove on basal third faint, punctate before groove, polished and with few scattered punctures behind groove; tergites 5 to 8 smooth and polished.

Black with orange-brown on at least two tergites. Clypeus, mandible except teeth, side of face reaching up to three-fourths length of eye, a spot on shoulder, scutellum, and transverse band on central third of metanotum yellow; mandibular teeth, face (yellowish in some specimens), scape and pedicel, stigma except orange base, and veins fuscous; flagellum, all legs except part of hind tibia and hind tarsus, second and third abdominal

segments (also the first and/or fourth segments in some specimens) orange-brown; hind tibia tricolorous: basal fourth fuscous, next third of tibia yellow, next fifth of tibia fuscous, apical fourth orange-brown; hind tarsus fuscous.

Male.—Unknown in the Philippines. Males from the United States differ from the females largely in having the face entirely yellow.

Specimens.—Female, Mount Santo Tomas, Mountain Province, 6,500 feet, December, 1952, H., M., and D. Townes (Townes); female, Baguio, Mountain Province, June, 1949, C. R. Baltazar (College of Agriculture at Los Baños); female, Baguio, Mountain Province, Baker (U. S. National Museum); 2 females, Manila, August, 1953, C. R. Baltazar (Bureau of Plant Industry at Manila); 2 females, Manila, W. A. Stanton (U. S. National Museum).

5. Genus PROMETHES Foerster

Promethes FOERSTER, Naturh. Ver. Rheinlande Verh. 25 (1868) 162.
Type: *Bassus sulcator* Gravenhorst. Included by Woldstedt, 1877.
Liopsis FOERSTER, Naturh. Ver. Rheinlande Verh. 25 (1868) 162.
Type: *Bassus sulcator* Gravenhorst. Designated by Viereck, 1912.
Promethus THOMSON, Opus. Ent. fasc. 14 (1890) 1465, 1475.
Type: *Bassus sulcator* Gravenhorst. Designated by Viereck, 1912.
Sussaba CAMERON, Bombay Nat. Hist. Soc. Jour. 19 (1909) 729.
Type: (*Sussaba bicarinata* Cameron) = (*Bassus*) *pulchellus* (Holmgren). Monobasic.

This genus has the face polished, rarely mat (in some extralimital species). The polished face separates it from the rest of the genera, which have the face mat.

Clypeus impressed from near the base; flagellum in male with tyloids; notaulus present (in the Philippine species) or absent; areolet absent; propodeum with sharp carinæ; first tergite narrow, about twice as long as wide; second tergite and third without a transverse groove; "pleura" of last tergite in male fused with the tergal sclerite.

The only species of this genus, *philippinensis,* has a groove originating from the posterior margin of the eye and cutting across the malar space to the dorsal base of the mandible. This character is not found in the other species of Philippine Diplazoninæ.

PROMETHES PHILIPPINENSIS sp. nov. **Plate 1, fig. 8.**

Female.—Forewing about 4.4 mm long. Head polished, impunctate, with fine scatttered hairs except on frons; face impressed next to clypeus; clypeal margin entire, slightly convex; malar space about 1.5 basal width of mandible, a groove

originating from posterior margin of eye and running diagonally forward to the dorsal corner of mandible; antenna with 25 segments, last segment about 1.5 as long as wide, about 1.5 as long as preceding. Thorax polished, impunctate; notaulus impressed to about 0.4 mesoscutum length; propodeum strongly carinate, areola closed, apical area subovate, about thrice as long as areola, median, lateral, apical, and basal carinæ present; collar of pronotum with longitudinal striæ at sides; midsternal groove deep. Areolet absent, nervellus straight and not broken. Tergites smooth and polished except first; first tergite about twice as long as wide, wrinkled or with irregular longitudinal striæ, its two longitudinal carinæ indistinct; second tergite with longitudinal striæ at central third of base.

Black with yellow bands on tergites. Mandible except teeth, and palpi yellow; clypeus, scape, and pedicel yellowish brown, flagellum and mandibular teeth fuscous; tegula, posterior tip of pronotum, subalar elevation of mesopleurum, axillaries, and base of costa yellow; stigma except pale base, and veins fuscous; fore and middle legs mostly yellow, beyond femur brownish; hind legs brown except yellow coxa and second trochanter, hind tarsus fuscous; first tergite black, the rest of the tergites dark brown except as follows: two basal subelongate spots and apical margin of second tergite, basal half of third tergite, basal third of fourth tergite, basal corner of tergites 5 and 6, and apical margin of seventh tergite yellow.

Male.—Forewing about 4.5 mm long. Similar to the female except as follows: clypeus, ventral side of scape and pedicel, fore and hind legs entirely yellow. Antenna with 25 segments as in female. Tyloids linear, present on antennal segments 9 to 12.

Type.—Female, Mount Santo Tomas, Mountain Province, 6,500 feet, November 22, 1952, Townes family (Townes).

Paratypes.—From the same locality as type: female, 7,300 feet, April 3, 1953, H., M., and D. Townes (Bureau of Plant Industry at Manila); male, 7,200 feet, November 29, 1953, H. Townes (Townes); 2 males, 6,800 to 7,300 feet, November 29, 1953, C. R. Baltazar (Bureau of Plant Industry at Manila, and U. S. National Museum); male, 7,300 feet, November 29, 1953, A. Marmeto (Bureau of Plant Industry at Manila); 5 males, Dapitan, Zamboanga, Baker (U. S. National Museum, Townes, and Bureau of Plant Industry at Manila).

ILLUSTRATIONS

(Photographs from the types by Dr. Henry Townes)

PLATE I

FIG. 1. *Syrphoctonus varianus* sp. nov.
2. *Syrphoctonus nigricoxus* sp. nov.
3. *Homoporus uichancoi* sp. nov.
4. *Homoporus otanesi* sp. nov.
5. *Diplazon luzonensis* sp. nov.
6. *Diplazon visayensis* sp. nov.
7. *Enizemum townesae* sp. nov.
8. *Promethes philippinensis* sp. nov.

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PLATE 1

NUTRITIONAL EVALUATION OF MEALS SERVED IN GOVERNMENT INSTITUTIONS BY CHEMICAL METHODS

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In recent years, there has been a growing interest among nutritionists and laymen alike over the nutritive quality of meals served in government institutions. Evaluations of such meals have been made by various workers [Santos (1933, 1934), Santos and Pidlaoan (1937), Concepcion (1937, 1937), Santos and Gutierrez (1939)]. In these studies food records of some type were kept and subsequently computed for nutrient values with the use of food tables. While data from these studies have proven useful, there remains the question of how closely the computed values approximate the actual intake. This question has been raised because of the following considerations:

1. Nutrient losses by chemical change like oxidation and physical loss in food preparation during handling, storage, cooking, and discarding of cooking water. Tables on food composition used in dietary evaluations give average nutrient values for raw foods. Concepcion and Intengan (1952) report wide variations in cooking losses. These depend on several factors such as type of food, length of cooking time, amount of cooking water, and others.

2. Inability of subjects to report weights or accurate measures of foods consumed. When computations are made from a market order or food account of an entire institution, the difficulty is one of translating measures into weights since many institutions do not have as yet a standard procedure of food purchasing.

3. Even if a fairly accurate food record were possible, such a record would still not indicate how the total amount of food is distributed among individuals. Furthermore, wastage in preparation would not be reported.

4. Thomas and co-workers (1950) point out other sources of error in the computation of uncontrolled menus such as a variable mineral content of the water supply, trimming of all visible fat from meat, and inherent discrepancies between actual food composition and the values as given in food tables. In their study, they found significant differences between computed and analyzed values for fat, protein, calcium, vitamin A, thiamine, riboflavin, and niacin. No significant differences were found for energy, phosphorus, and ascorbic acid.

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In making a quantitative study of institution meals in the absence of a more or less complete and representative table of values for cooked Philippine foods and a systematic method of food marketing and purchasing, the Foods and Nutritional Biochemistry Laboratory of the Institute of Nutrition, Manila, resorted to the use of chemical methods of analyses for the evaluation of meals served in local government institutions.

A limited number of dietary evaluations by chemical methods have been made. Aron and Hocson (1910) in the course of their metabolism studies on Bilibid prisoners determined the nitrogen and phosphorus intake by chemical analysis. Concepcion and Samson (1931) analyzed "fiambrera" lunches for nitrogen, calcium, iron, and phosphorus. The study of Thomas, et al. (1950) has been cited. Hawks, et al. (1940) analyzed diets for the purpose of determining the influence of technique on the composition values of identical diets. Lockhart, et al. (1944) made a study of the nutritional quality of dietaries by chemical analysis.

EXPERIMENTAL PROCEDURE

Nine government institutions cooperated in this study. For purposes of subsequent comparisons, the diets used in this study were divided into those served: (1) on children, (2) on convalescents, (3) on moderately active adults, and (4) on very active adults.

Sample collections.—The dietitians of the cooperating institutions were informed of the purpose of the study, the importance of obtaining representative meal samples, and were given an assurance that all data would be confidential. A tray selected at random from each of the three meals for three days (except Saturday, Sunday, and Monday) making a total of nine meals were requested from each institution. Between-meal snacks, tea, coffee, milk, and liquids other than water were included. Meals collected were placed in "fiambreras" (each dish was placed in separate container), and a record was made of the food items in each meal. All liquids were placed in clean bottles. Food collected were brought immediately to the laboratory, stabilized and refrigerated until ready for analysis.

In the case of institutions for convalescents, two sets of diets were collected, one for the junior personnel and charity patients, and another for the senior personnel. In most

cases, one of our laboratory staff members collected these diets. In other cases, the samples were brought to our laboratory by the cooperating institutions. Collections were made either on consecutive days or on days chosen at random. A total of 144 separate meals were collected and analyzed.

Sampling and analytical methods.—Upon receipt of the meals in the laboratory, the edible portion of each dish or food item was weighed separately and total weight of the meal was recorded. The meal composite with the exception of rice was homogenized in a Waring blendor. The methods of sampling and analysis used by Intengan, et al. (1953) were followed. The rice was analyzed separately and in consecutive collections from the same institution, only the weight of rice was recorded and corresponding values based from the initial analysis were computed. All samples were usually analyzed within the week except for ascorbic acid which was determined the day after collection.

The factor 6.25 was used as protein conversion factor. Carbohydrate was computed by difference while the energy value of the diets was computed from the carbohydrate, fat, and protein contents using Atwater's physiological fuel values of 4, 9, and 4 calories per gram of nutrient respectively. No analysis was made for vitamin A. Hence vitamin A values reported here are from carotene as analyzed and from vitamin A value reported in food tables, whenever there were substantial amounts of organ meats, milk, butter, cheese, and eggs.

RESULTS AND DISCUSSIONS

The results of analysis and estimations are summarized in Tables 1, 2, 3, 4, and 5. The values given represent averages of three-day collections. The tables indicate how the analyzed values compare with the daily allowance per specific nutrients recommended by the National Research Council of the Philippines as modified by the Institute of Nutrition (Salcedo, et al., 1952).

Comparison is here made, not with a view to assessing the nutriture of institution personnel and patients for, as Pett (1951) pointed out, recommended allowances which provide a margin of safety have limitations for evaluating individual or group dietaries. Darby (1947) emphasized that "inasmuch as variability is a fundamental atttribute in biology, it becomes impossible to fix a single figure as the requirement for a substance." Wilder (1945) noted that some persons who re-

ceive less than the recommended allowances for one or another nutrient may remain in health through long periods. It may also be stated that in the case of convalescents, the diets analyzed may not be typical of the intake of this group for a long period of time and thus cannot be used to evaluate their intake. On the other hand, comparison is being made in order to provide a basis for recommendation for the government institution diets. The recommended allowances thus take on the function of goals rather than standards.

Table 1 shows that in general, the meals served in all 3 children's institutions failed to provide the recommended allowances for calcium and ascorbic acid; one diet did not meet the allowances for calories, thiamine, and reboflavin; two diets were low in vitamin A. All three met the allowances for protein, iron, and niacin.

Table 2 shows that four out of the six diets for convalescents studied provided more than 100 per cent of the allowances for calories All diets were adequate in protein; only one diet was found to meet the allowances for calcium and riboflavin, and two, for vitamin C. Two diets were low in iron and one diet, in niacin. None of the diets was able to meet the allowances for vitamin A and thiamine.

If the average intake from Table 2 which also represents the intake of the junior personnel, is compared with the allowances for a moderately active man (Table 3) it can easily be seen that this group is the least provided for, nutritionally speaking, in our government institution.

All six diets (Table 4) for institution personnel were found to fall below the recommended allowances for calcium, riboflavin, and protein. Five diets had deficits in thiamine, ascorbic acid, and vitamin A, four were low in calories, while two failed to meet the recommended allowances for niacin.

The three-day diet (Table 5) of enlisted men from an army camp was found to meet the allowances for a very active man except in the values recommended for vitamins. Only niacin was found adequate. Ascorbic acid, thiamine, riboflavin, and witamin A contents ranged from low to marginal amounts.

It is recognized that the method of evaluation used here is not entirely without limitations. Thomas, et al. (1950) point out that probably the most significant of these lies in the sampling procedure used. A tray which was typical of those served to patients and personnel was chosen. However, the

sizes of servings from tray to tray can hardly be expected to be uniform. Furthermore, the portions of foods would also be different and thus affect the analytical values found. One serving of "sinigang," for example, may contain the head part of the fish while another would have the tail, or one serving of the same may contain more greens than the other. These are errors beyond the precision of any known procedure of mass dietary evaluation. We tried to minimize this discrepancy and to give a better picture of the actual intake by analyzing three-day diets.

The data on each nutrient for each meal of each institution which are too voluminous for inclusion here indicate the following: that where enriched rice is not used, the thiamine content of the meal is likely to be low; that in many of the institution diets studied, ascorbic acid-rich foods are not provided in the breakfast meal; that although leafy green and yellow vegetables are present in the menus, the servings are not enough to supply the recommended allowances for vitamin A; that there is a good distribution of protein in the three meals of the day which previous studies [Leverton and Gram (1949), Woods (1950)] have shown to promote better nitrogen utilization; that breakfast is the least nutritious meal of the day while lunch and dinner furnish comparative amounts of each nutrient to the day's requirements; and that the senior personnel of local government institutions are the best fed among the groups studied.

A random selection of sample menus from children's, convalescent's and personnel's dietaries of government institutions are presented below. The generalizations made in this discussion were found to apply to these random selected dietaries.

CHILDREN'S DIET

Breakfast	Lunch	Dinner
Oatmeal w/milk and sugar	Mongo beans (sautéed)	Noodle soup w/pork
Bread	Dried fish	Tortilla, meat w/sweet peas
Margarine	Rice	Rice
Coffee	Balimbing	

CONVALESCENT'S DIET

Breakfast	Lunch	Dinner
Boiled egg	Hamburger w/tomato catsup	Sitaw w/pork and shrimps
Bread	Pechay w/pork and shrimps	Fried fish
Margarine	Rice	Tomato
Coffee	Banana	Rice
Orange		Ubi fudge

PERSONNEL'S DIET

Breakfast	Lunch	Dinner
Fried egg	Bachoy (pork soup)	Dinengdeng (eggplant,
Cheese	Fried fish	sitaw, kangkong, ba-
Bread	Sweet potato leaves &	goong, etc.)
	okra	Salted fish
Coffee	Rice	Rice
	Banana	Banana

While a cursory glance at the menus shows that the Basic 6 has been followed, chemical analysis of the diets showed that optimum amounts for each nutrient were not provided. Food groups which need emphasis in food planning to improve institution dietaries are Group 1—leafy green and yellow vegetables, Group 2—vitamin C-rich foods, and Group 5—especially the dried beans and mongo.

The pattern of the menus shows that rice forms the basis of the diet. This study shows that the average rice intake contributes 40 per cent to total caloric intake which represents 56 per cent of total dietary carbohydrate. On an average protein intake of 87 gm ± 22 in this study, 24 per cent is contributed by rice.

From the cost of meals in this study which ranges from ₱0.45 to ₱2.00 and their corresponding nutritional quality it would appear that an adequate diet may be obtained in institutions, even during a period of inflated food costs, provided expensive foods and luxury items are excluded.

Stiebeling (1950) reported that there is a greater proportion of carbohydrate foods in low cost than in high cost dietaries. In this study, a high correlation ($r = 0.952$) was obtained between cost and carbohydrate content in 16 pairs of observations. A high correlation ($r=0.964$) was also obtained between cost and total calories. The present high cost of rice (₱0.15 for an average daily allowance of 360 gm) may explain the high correlation between cost to total calories and carbohydrate. Proteins and fats are usually expensive items in the diet and the high correlation to cost, 0.971 and 0.946, respectively, obtained of these nutrients, was expected.

While improvements in proteins, fats, and carbohydrates were noted as cost of meal allowance was increased, such improvements did not hold true for the other food nutrients.

TABLE 1. —*Average composition of meals served to children's institutions compared with daily recommended allowances.*

Nutrients	Recomended allowances for children 7 to 9 years	Institution I (₱1.00 per day)		Institution II (₱0.80 per day)		Institution III (₱0.80 per day)		Average intake for children	
		Average intake	Per cent of RA	Average intake	Per cent of RA	Average intake	Per cent of RA	Intake	Per cent of RA
Calories	1,800	1,866	104	1,520	84	2,404	133	1,930	107
Protein, gm.	55	79	144	56	102	77	140	71	129
Fat, gm.		54		23		50		42	
Carbohydrate, gm.		261		270		364		298	
Calcium, gm.	1.0	0.8	80	0.6	60	0.4	40	0.6	60
Iron, mg.	5	13	260	9	180	8	160	10	200
Vitamin A, I.U.	3,000	3,970	132	1,113	37	1,491	50	2,191	73
Thiamine, mg.	0.8	1.5	188	0.4	50	0.8	100	1.2	150
Riboflavin, mg.	1.3	1.7	130	1.4	108	1.0	77	1.4	108
Niacin, mg.	8	20	250	8	100	13	162	14	175
Ascorbic acid, mg.	60	43	72	41	68	57	95	47	78

TABLE 2.—*Average composition of meals served to convalescents in five hospitals compared with recommended allowances.*

Nutrients	Recommended allowances for sedentary man	Hospital I (₱0.90 per day)		Hospital II (₱0.65 per day)		Hospital III-A (₱2.00 per day)		Hospital III-B (₱1.54 per day)		Hospital IV (₱0.90 per day)		Hospital V (₱0.45 per day)		Average for convalescents	
		Average intake	Per cent of RA	Average intake	Per cent of RA	Average intake	Per cent of RA	Average intake	Per cent of RA	Average intake	Per cent of RA	Average intake	Per cent of RA	Intake	Per cent of RA
Calories	2,100	2,263	108	2,193	104	3,092	147	3,107	148	1,814	86	1,753	83	2,370	113
Protein, gm.	55	73	132	79	144	138	251	114	207	59	107	59	107	87	158
Fat, gm.		34		29		69		85		50		17		47	
Carbohydrate, gm.		417		404		478		473		282		341		399	
Calcium, gm.	0.7	0.4	57	0.4	57	0.6	87	0.9	129	0.3	43	0.5	71	0.5	74
Iron, mg.	12	14	117	10	83	17	142	19	158	4	33	12	100	13	106
Vitamin A, I.U.	4,000	2,346	59	1,667	42	3,398	85	2,225	56	807	20	642	16	1,848	46
Thiamine, mg.	1.3	1.2	92	1.0	77	1.1	85	1.0	77	0.5	38	1.2	92	1.0	77
Riboflavin, mg.	2.2	1.1	50	1.4	64	2.3	102	1.6	73	0.8	36	1.0	45	1.4	62
Niacin, mg.	13	15	115	26	200	20	154	13.0	100	12	92	19	146	18	135
Ascorbic acid, mg.	75	24	32	37	49	150	200	101	135	5	7	37	49	59	79

TABLE 3.—*Average composition of meals to junior personnel compared with recommended allowances.*

	Calories	Protein	Fat	Carbohydrate	Calcium	Iron	Vitamin A, I.U.	Thiamine	Riboflavin	Niacin	Ascorbic acid
		gm	*gm*	*gm*	*gm*	*mg*		*mg*	*mg*	*mg*	*mg*
Average intake in 5 institutions	2,370	87	47	399	.5	13	1,848	1.0	1.4	18	59
Recommended allowances for moderately active adult	2,600	55	----	----	.7	6	4,000	1.6	2.7	16	75
Per cent of recommended allowances	91	158	----	----	71.0	217	46	62.0	52.0	112	79

TABLE 4.—*Average composition of meals served to personnel in seven government institutions compared with recommended allowances.*

Nutrients	Recommended for moderately active man	Institutions I (₱1.00 per day)		Hospital I (₱1.20 per day)		Hospital II (₱0.70 per day)		Hospital III (₱1.00 per day)		Hospital IV (₱1.00 per day)		Hospital V (₱0.60 per day)		Average for personnel	
		Average intake	Per cent of RA	Average intake	Per cent of RA	Average intake	Per cent of RA	Average intake	Per cent of RA	Average intake	Per cent of RA	Average intake	Per cent of RA	Intake	Per cent of RA
Calories	2,600	1,795	69	2,751	106	2,406	93	2,146	83	2,830	109	2,038	78	2,328	89
Protein, gm.	55	74	135	106	193	90	164	83	151	83	151	83	151	87	158
Fat, gm.	----	41	----	92	----	64	----	64	----	86	----	50	----	66	----
Carbohydrates, gm.	----	296	----	374	----	367	----	310	----	431	----	314	----	349	----
Calcium, gm.	0.7	0.5	71	0.6	86	0.5	71	0.6	86	0.6	86	0.4	57	0.5	76
Iron, mg.	6	15	250	13	216	10	167	13	216	7	117	12	200	12	194
Vitamin A, I.U.	4,000	1,782	45	3,325	83	2,809	70	2,142	54	994	25	4,275	107	2,555	64
Thiamine, mg.	1.6	1.8	113	1.3	81	1.1	69	0.7	44	0.7	44	1.4	88	1.2	73
Riboflavin, mg.	2.7	1.0	37	1.3	48	1.5	56	1.0	37	1.0	37	1.2	44	1.2	43
Niacin, mg.	16	23	144	18	113	28	175	13	81	15	94	24	150	20	126
Ascorbic acid, mg.	75	102	136	53	71	42	56	58	77	19	25	48	64	54	72

TABLE 5.—*Average composition of diet of enlisted men in an army camp compared with recommended allowances (₱0.95 per day).*

	Calories	Protein	Fat	Carbohydrate	Calcium	Iron	Vitamin A, I.U.	Thiamine	Riboflavin	Niacin	Ascorbic acid
		gm	*gm*	*gm*	*gm*	*mg*		*mg*	*mg*	*mg*	*mg*
Average intake for 3 days	3,619	98	62	675	.7	13	1,250	1.3	1.4	23	53
Recommended allowances for very active adults	3,400	55	----	----	.7	6	4,000	2.0	3.3	20	75
Per cent of recommended allowances	106	178	----	----	100.0	217	31	65.0	42	115	71

SUMMARY

A total of 144 meals representing three-day dietaries were collected from nine government institutions and analyzed for nitrogen, fat, carotene, thiamine, riboflavin, niacin, ascorbic acid, calcium, and iron, and computed for vitamin A, carbohydrate, and calories. The results were compared with recommended allowances for specific nutrients.

Adequate to liberal amounts of protein and niacin were found. In many meals, calories and iron were within the recommended allowances. A good distribution of fats and carbohydrate to total caloric intake was noted. Inadequate to marginal intakes were found for thiamine, vitamin C, and calcium. Most conspicuous deficiencies were in vitamin A and riboflavin.

Statistical analyses indicated high correlations between cost and calories, carbohydrate, fat, and protein contents.

On the basis of this study, generous amounts of vitamin C-rich foods, adequate amounts of green and yellow vegetables, liberal use of pulses, nuts and seeds, and enriched rice are some of the measures advocated for the improvement of dietaries in government institutions.

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COMPOSITION OF PHILIPPINE FOODS, II

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In continuation of the first report [Intengan et al (1953)] covering the initial project of the Foods and Nutritional Biochemistry Laboratory of the Institute of Nutrition shortly after its establishment, the present paper presents the analyses of 167 samples of indigenous food plants and food products. Represented are 40 leafy vegetables, 20 vegetable fruits, 44 fruits, 5 vegetable flowers, 38 pulses, nuts and seeds, 15 roots, bulbs and tubers, and 5 vegetable shoots and stems.

The samples were obtained mostly from the city markets. private orchards and a few samples from the provinces. These samples were collected during the last half of 1951 and the whole year of 1952.

The methods of sampling, stabilizing, and analyses have been reported in the first paper (1953). Sampling was done on the edible portion of about a kilogram of the food sample. Analyses were made for moisture, nitrogen, crude fiber, fat, ash, calcium, phosphorous, iron, carotene, thiamine, riboflavin, ascorbic acid, and niacin. Also reported is the percentage of edible portion.

DESCRIPTION OF FOODS STUDIED

1. FRUITS

Avocado (*Abokado*).—The tree is medium-sized and bears seasonal fruits of variable sizes and shapes—pear-shaped to round—and of varied colors ranging from green to dark purple. The fruit, which has a thick and leathery skin, may be eaten with or without sugar and milk, or as a vegetable in raw salads, though it is more popularly used in making ice cream. Many people are aware of its nutritious value and many are appreciative of the bland and nutlike flavor of its soft and yellowish to greenish flesh. The fruit contains one large seed. Sample (*a*) had dark purplish skin and measured an average

of 10 by 7 cm and 300 gm weight. Sampling was made on 6 fruits. Sample (*b*) was prepared from 4 fruits having a dark-green skin and having the same sizes as those of the first sample.

BURI (*Buli*).—This is the fruit of a stately palm tree widely scattered in the Philippines. About 2 kg of the spherical green fruit was sampled. The small fruit is 2 to 2.5 cm in diameter, and the thick porous pulp about one-half cm thick covers the white chewy meat. This may be eaten raw but tastes much better when preserved in syrup.

GUAVA (*Bayabas*).—The fruits of both samples (*a*) and (*b*) were about the same sizes but were purchased from different market places. The fruits were green and rounded averaging 4 cm in diameter. Guavas contain many seeds embedded in an aromatic yellowish edible pulp. On further ripening, the skin turns yellow accompanied by a stronger aromatic flavor. The fruits are eaten raw, but are also extensively used in the manufacture of jellies due to the presence of a considerable amount of pectin. Guavas are also used for flavoring some Filipino dishes and as dessert with coconut milk and sugar.

LIME (*Dayap*).—This is the fruit of a shrub or a small tree found throughout the Philippines and is used as substitute for imported lemon. Sample (*a*) had an average measure of 4 by 5 cm, and was green in color, 10-celled or more, small-seeded and thin-skinned. The rind of the lime was used in the preparation of sample (*b*). Lemon rind is used for flavoring desserts like custard and coconut sweet.

JAVA-PLUM (*Duhat*).—This is a seasonal fruit of a large tree. It is produced in clusters and range in color from a purplish red to deep blackish violet. It has a thin skin, a juicy and slightly tinted flesh with a tart taste, enclosing an oblong seed. Table salt enhances the agreeable flavor of the fruit. Its juice also makes a good drink—fresh or fermented.

POMEGRANATE (*Granada*).—The fruit is rounded and reddish-yellow with an average diameter of 7.5 cm. The skin is smooth and breaks easily on pressure. The fruit contains numerous small seeds, each seed being surrounded by a very juicy, translucent, pinkish-red pulp of slightly acid taste.

STAR APPLE (*Kaimito*).—The green fruits sampled in (*a*) were somewhat rounded and averaged 7 cm in diameter. The skin is thick and smooth and gives a milky, sticky exudate when cut. Only the gelatinous slightly translucent pulp was

used in the preparation of the sample. The fruit contained 6 to 10 black seeds arranged radially. Nine fruits of the purple variety from Cavite were sampled in (*b*). The pulp varied in color from light to dark purple.

GUAMACHIL (*Kamatsili*).—This fruit tree is medium-sized. The fruits come in pods, twisted and often spiral. Fruits sampled were 7 to 11 cm long and the number of seeds varied from 4 to 9 in a pod. Each seed is enclosed by an edible, whitish and slightly sweet compact pulp.

BILIMBI (*Kamyas*).—The fruit grows in clusters from the trunk and other branches of the tree. The samples measured 6 by 2 cm. This gherkinlike fruit is light green in color, is acidic, but is pleasant when candied or cooked with sugar as a preserve. It is also used for flavoring Filipino dishes.

CASHEW FRUIT (*Kasuy*).—The fruit consists of two parts: the lower portion is pear-shaped, light yellow in color, fleshy, juicy, has a very aromatic flavor and a tart and acidic taste. On top of this fleshy portion is a kidney-shaped nut, the kernel of which is also edible and reported in the section on Pulses, Nuts, and Seeds. The fleshy portion (except the bottom part) of 7 fruits from Zambales with an average measure of 6 cm was used in preparing the sample for analysis.

PHILIPPINE DILLENIA (*Katmon*).—This fruit is found only in the Philippines, according to Dr. Quisumbing. The tree grows in low and medium altitude forests. The fruit is about 5 cm in diameter. Enclosed by light green thickened sepals is the edible soft, green, juicy pulp consisting of several segments twisted and arranged in a spiral form. The juice is acidic and makes an excellent jam, sauce or flavoring.

JACKFRUIT (*Langka*).—The fruits used as samples were purchased from the local market and had an average diameter of 20 cm. The seeds are numerous and oblong and are edible. A luscious rich yellow pulp, sweet, and aromatic, encloses the seeds. The sample was prepared from the ripe pulp which may be eaten from the hand, candied or preserved in syrup.

LITCHI (*Litsiyas*).—The fruits sold in local markets are imported from China. The ovoid fruit comes in bunches, measures about 3 cm across, has thin and warty skin, and color varies from red to dark brown depending upon the freshness of the fruit. Each fruit contains a dark-brown seed enclosed by a translucent, sweetish, juicy pulp.

LEMON (*Limon*).—The fruits sampled in (*a*) were the imported yellow lemon used locally to vary the flavor of drinks or of prepared dishes. Sample (*b*) consisted of the rind which is utilized for flavoring custards or other desserts.

EBONY (*Mabulo*).—The tree which bears this fruit is medium-sized. The fruits are roundish and those used in the sample averaged 5 by 8 cm in diameter. The skin is velvety and reddish; flesh is cream-colored, firm, sweet, aromatic, and contains several large seeds.

CURACAO-APPLE (*Makopa*).—The fruits were gathered from a medium-sized tree in Mandaluyong, Rizal. The pear-shaped fruits are about 3 cm long, rose-pink, waxy-looking, and come in clusters of 2 to 5 pieces. The pulp is fluffy and sour-sweet, but rather "leathery" to be palatable.

MANGO (*Mangga*).—Other varieties of this fruit have been described in the first paper. The fruits of sample (*a*) consisted of the unripe carabao variety which rank first in quality and flavor among the different varieties of mangoes. Green mangoes (any variety) are usually eaten with salt, "bagoong" (fermented and salted small fish) or pickled. Sample (*b*) is the "Pahutan" variety which has relatively larger seeds, fibrous flesh, and is considered most inferior in quality (*c*) "Piko" mango is number two in quality. This variety is smaller than the carabao mango and more pointed at the tip. The unripe fruits sampled measured 13 cm long and had an average weight of 230 gm. Ripe fruits of the same variety were used in sample (*d*). This variety ripens before the skin turns yellow and has a superior taste when the round end is just starting to change in color.

APPLE (*Mansanas*).—The tree is not grown in the Philippines. The fruits analyzed in sample (*a*) were the red variety measuring about 5 by 6 cm. The flesh is white to yellowish, firm and slightly acidic in taste. The sample was prepared from the flesh of the fruit. Green apples of about the same size as the red variety were used in sample (*b*). These fruits although imported are studied due to their popular use in the country.

CANTALOUPE (*Milon, kastila*).—A sample of this variety has been reported in the first paper. This fruit has a yellow skin and the flavor is more pronounced than the native variety.

MELON (*Milon, tagalog*).—The fruits sampled were elongated with a diameter of about 12 cm. The skin of this fruit is sur-

rounded with greenish spots, the flavor is inferior, and the texture is not as juicy as the Spanish melon.

PAPAYA (*Papaya*).—The fruit purchased at Pasay City market weighed almost a kilo and measured a foot in length. The fruit was oblong and had an orange-yellow, sweet, juicy flesh. Our first paper reported the analysis of another sample of papaya.

STINKING PASSION FLOWER (*Pasyonaryang mabaho*).—Immature fruits are subtended by a prominent involucre of 3 bracts. The fruits turn yellow when ripe and the pulp has a sweetish taste. Ripe fruits were sampled.

PINEAPPLE (*Piña*).—Sample (*a*) was a native variety of pineapple with an average length of 18 cm. The fruits were purchased at Blumentritt market. Sample (*b*) was the Hawaiian variety, also called Cayenne pineapple, and is usually more juicy than the native variety. Sample (*c*) was another native pineapple with a very sweet taste. It was smaller than sample (*a*).

BANANA (*Saguing*).—Several varieties had been reported in the first paper. The bananas analyzed in this series were of different varieties grown in the Philippines. (*a*) This is known locally as "bungulan," is green even when mature, has a distinctive flavor, and excels as a dessert fruit. (*b*) This is known locally as "saba" and is usually eaten cooked—fried, roasted or boiled. The fruit measures 10 to 12 cm, is broader than the other varieties and is prominently 3-angled. The skin is rather thick. (*c*) The *ternate* variety measures 10 to 12 cm long, and its peach-colored flesh has a fine texture and a distinctive aromatic flavor. (*d*) Called *Gloria* (also known as *ternate*). This fruit is smaller, thin-skinned, and its pinkish-yellow flesh has a fragrant flavor.

TAMARIND (*Sampalok*).—The ripe fruit was used in sampling, and only the brown, soft, and acidic pulp was used in preparing the slurry. The previous report gave an analysis of the green fruit.

GOVERNOR PLUM (*Serale*).—The small purplish red-colored fruits came from Zambales and measured about 2.5 cm in diameter. The white juicy pulp has a slightly acidic taste. It contains 4 to 6 seeds radially arranged on its core.

POMELO (*Suha*).—The sample was prepared from the edible portion of two fruits purchased at Pasay City market. Average measure was 12 by 13 cm. Another sample has been reported in the first paper.

Susung Kalabaw.—The fruits were purchased at Pasay City market and came in clusters. The fruit is smooth, ellipsoid and about 2.5 cm long. The skin is orange-red in color and encloses 5 to 15 black seeds with very little acidic pulp.

CANISTEL (*Tiyesa*).—These are orange-colored fruits, ovoid in shape, strongly aromatic in flavor, and thin-skinned. The pulp, which is also orange in color, has the consistency of boiled sweet potato. The fruit has one large dark-brown seed.

PONDEROSA (*Tsiko-mamey*).—The sample came from a private backyard in San Juan, Rizal. Ponderosa was first introduced into the Philippines around 1915 and fruited for the first time about 18 years later. Fruits range in weight from 100 to 500 gm. The pulp is reddish brown, juicy, and delicious when properly ripened.

2. VEGETABLE LEAVES

FRAGRANT PREMNA (*Alagaw*).—These are the leaves of a small tree. Only the young leaves were used in preparing the sample. The leaves are ovate, somewhat heart-shaped at the base and pointed at the tip. Its use as a vegetable is not very common; it is more popular as a medicinal plant.

BITTERMELON TOPS (*Ampalaya*).—The young and tender leaves of this climbing vine were sampled in (*a*). The leaves purchased from Pasay City market were rounded, lobed, heart-shaped at the base and measured 4 to 9 cm in diameter. Sample (*b*) came in cut vines about half a meter long but only the young leaves were sampled. The leaves measured 4 to 7 cm wide.

Asistasya.—This sample came from Cabiao, Nueva Ecija. The leaves are ovate, 2.5 to 4 cm wide, broad at the base and pointed at tip. The young leaves and tender stems were used.

GARLIC LEAVES (*Bawang*).—The plant is a low herb 30 to 60 cm high. The bulb measured 1 to 2.5 cm; stem, 18 to 23 cm; and leaves, 35 to 42 cm. The leaves are linear and flat and vary in number from 4 to 6 on each stem. The whole plant without the roots was used in preparing the sample for analysis.

Dampalit.—This plant grows along river banks and near the seashore. The leaves are narrow, about 0.25 to 0.5 cm wide and 3 to 4 cm long, are fleshy and almost cylindrical. They are often used as vegetable with "sinigang" and are especially delicious when pickled. The leaves sampled were gathered from the brackish water of Obando, Bulacan.

TARO LEAVES (*Dahon ng gabi*).—Analyzed sample of large taro leaves has been reported in the first paper. Sample reported here are smaller leaves having an average measure of 15 by 18 cm. The leaves were allowed to wilt overnight prior to sampling.

SEAWEED (*Gulamang-dagat*).—This is a long, slender, filamentous green alga which is usually used for making salad. The seaweed was purchased at Blumentritt market.

Himbabau.—The young leaves were used in sampling.

NEW ZEALAND SPINACH (*Ispinakang Baguio*).—This has become popular as a food plant rather recently. The leaves vary from 2 to 12 cm in length. The edible portion consists of the new growth including tender leaves and stems. The whole plant averages about half a meter long.

SQUASH TOPS (*Talbos ng kalabasa*).—The leaves of this vine are coarse, about 8 cm in diameter, rounded but heart-shaped at the base, shallowly 5-lobed and very finely toothed at the margins. This vine has long tendrils 22 to 35 cm long which were also included in the preparation of the sample.

SWEET POTATO TOPS (*Talbos ng kamote*).—This is one of the commonest edible, inexpensive, and useful leafy vegetables in the Philippines. The leaves are pointed at the tip and heart-shaped at the base. The leaves sampled had an average measure of 5.5 by 6 cm. Sample (*a*) was submitted by the Bureau of Plant Industry, while sample (*b*) was bought from the market. The color varies from green to purple. The young leaves are steamed and used as a salad, in soups, as a vegetable cooked with meat, fish, or shrimps, or seasoned with "bagoong."

CASSAVA LEAVES (*Kamoteng kahoy*).—The leaves are seldom used as a vegetable but in some regions of the Philippines, the young leaves have been found edible. Accordingly, the leaves sampled are very young ones. They measured 12 to 19 cm and are divided at the base into 5 to 7 narrow segments.

SWAMP CABBAGE (*Kangkong*).—These are the leaves of an aquatic plant which thrives in both stagnant streams and fresh-water ponds. The terminal shoots were used in sampling. The leaves used measured 5 to 8 cm long. *Kangkong* is widely used in combination with fish or meat in soups and other dishes and as a salad seasoned with either *kalamansi* or *bagoong.*

CHINESE CELERY (*Kintsay*).—The plant is sold in the market in bundles of 15 to 20 plants including the roots. The plant measures from 42 to 53 cm long. Only the young leaves and tender stems were used in sampling. The leaves are especially used for seasoning due to their volatile oil which imparts a characteristic flavor to such dishes as "pancit," "chop suey," etc. The leaves are small, 2 to 4 cm long, pinnate, with large, deeply-lobed segments, and dark green in color. Two samples have been reported in the first paper.

Kulitis.—This plant is a common weed found throughout the Philippines. The tender tops are sold in the markets and used like spinach. Sample (*a*) was prepared from leaves 5 to 8 cm long and came from Los Baños. Sample (*b*) consisted of smaller leaves which were purchased at Paco market.

LEEK (*Kutsay*).—It is believed that this plant was introduced from China. It is onion-scented, has very small white bulbs, and green, grasslike, linear, and flat leaves measuring 0.5 by 30 cm. The leaves are mainly used for the preparation of Chinese dishes and for flavoring and/or garnishing local dishes. The Bureau of Plant Industry submitted this sample. One other sample was reported in the first paper.

MALABAR NIGHTSHADE (*Libato, Alugbati*).—The plant is described in the first paper. Sample was prepared from the young leaves and stem of the vine from Los Baños, Laguna.

HORSE-RADISH TREE (*Malunggay*).—One sample has been reported in the first paper. The leaves used in sampling came from Los Baños, Laguna. The leaves were not as fresh as those reported earlier as they have been collected the previous day.

MUSTARD (*Mustasa*).—Fresh sample of leaves was reported in the first paper. The sample reported here had been salted and was obtained from Chinatown in Manila. The salting process is also being adopted in some Filipino homes.

PURSLANE (*Olasiman*).—This is a very common weed, spreading or prostrate, succulent, and branched. The leaves are small, fleshy, and flat. The leaves are edible in the form of a salad or in combination with meat or fish. The two samples reported here were gathered around the vicinity of the Institute of Nutrition.

FERN (*Pako*).—The young fronds are much desired and are eaten usually as salad. Sampling was made from the tendrils and tender portion of the fronds. The fern was

purchased at Pasay City market. Another sample has been reported in a previous paper.

PAPAYA (*Papaya*).—The papaya leaves have never been reported to be edible locally. However, it is popularly used in Indonesia as a vegetable dish in combination with grated coconut, chopped peanuts, and sugar, and highly seasoned with garlic and pepper.

CHINESE CABBAGE (*Petsay*).—Several samples have been reported in the first paper. Sampling on (*a*) was made on plants containing 5 to 11 leaves in each plant which was purchased at Pasay City market. The leaves measured 15 to 30 cm long. Sample (*b*) was the variety known as *wongbok* which has also been reported in the first paper. This sample was purchased at Pasay City market.

CABBAGE (*Repolyo*).—Two samples of cabbage were reported in a previous paper. In this report, sample (*a*) was purchased at Pasay City market; samples (*b*) and (*c*) were the purple variety—the former came from Baguio while the latter was purchased at Pasay City market.

CHILE TOPS (*Talbos ng sili*).—The leaves of pepper are extensively used in stews or for flavoring some Filipino dishes due to their somewhat piquant flavor. Only the young leaves were used for sampling. Samples (*a*) and (*c*) were purchased at Pasay City market, while sample (*b*) was from Los Baños College, Laguna.

YARD-LONG BEAN (*Sitaw*).—This plant is popular for its legume, but to a lesser extent the young leaves are also used as a leafy vegetable. The leaves sampled measured 5 to 10 cm long and are light green in color.

POTHERB (*Talinum*).—The leaves sampled in (*a*) came from the Bureau of Plant Industry and measured 3 to 6.5 cm long. Sample (*b*) was purchased at Pasay City market and varied in length from 5 to 8 cm. The leaves are prepared and eaten like spinach.

GARLAND CHRYSANTHEMUM (*Tango*).—This is a light-green leafy vegetable measuring about 5 to 9 cm long. The leaves are somewhat fleshy, bipinnately parted, narrow-lobed, and oblong. The plants are gathered while young, and, due to their spicy taste, are used as a condiment.

THORNY AMARANTH (*Uray*).—A sample of this weed has been included in the first paper. Only the young leaves which came

from Los Baños were used in preparing the sample reported here.

CORIANDER (*Wansuy*).—The first analysis of this plant has been reported previously. This sample was purchased at Pasay City market. Only the leaves, which are much like the Chinese celery except that they are larger, were used for sub-sampling.

3. VEGETABLE FRUITS AND LEGUMES

PIGEON PEA (*Kadios*).—The plant is a shrub about 1 to 2 meters in height. *Kadios* is chiefly used for its young pods and seeds which are edible. The sample analyzed came from Ilocos Sur. The pods measured 6 to 8 cm long and 1 cm wide, and contained 2 to 7 seeds. The seeds are green when young and creamish white on maturity.

SQUASH (*Kalabasa*).—The fruit is widely used in the Filipino diet as a vegetable or as a dessert. The fruit sampled was purchased at the local market and measured 20 by 20 cm.

Kamansi.—This is the roundish fruit of a large tree. The skin is prickly, and only the immature fruits are used as a vegetable when boiled in salt water. The seeds are numerous and are eaten either boiled or roasted. Both the seeds and the fleshy portion of the immature fruit were used in sampling.

TOMATO (*Kamatis*).—The fruits were purchased at Pasay City market and consisted of ripe berries measuring 4 to 5 cm in diameter. About 0.75 kg was used for sampling. They were of the thin-skinned and very juicy variety.

WAX GOURD (*Kundol*).—This is a spreading vine cultivated for its large creamish-green colored edible fruit. The sample was purchased at Divisoria market and measured 34 cm long by 15 cm; it was ovoid in shape and weighed 2.7 kg. The unripe fruit is boiled and eaten as a vegetable while the ripe fruit is candied.

RADISH FRUIT (*Labanos*).—The young pods came from Ilocos Sur. They measured 3 to 6 cm long and contained 2 to 7 seeds separated by pith.

JACKFRUIT, UNRIPE (*Langka, hilaw*).—This fruit is more popularly used when ripe but the young fruit may also be used especially as a vegetable salad. The unripe fruit sampled weighed more than a kilo and a half and measured 24 by 14 cm. Both the seeds and the pulp were used in preparing the sample.

HORSE-RADISH TREE, PODS (*Malunggay*).—The young leaves and pods of this small tree are used as a vegetable. The pods

used in sampling came from Urdaneta, Pangasinan. About a kilogram was used and consisted of long slender pods having an average measurement of 1.25 by 38 cm.

COWPEA (*Paayap*).—This legume is very similar to string beans, but is smaller, measuring 0.5 cm in width by about 11 to 15 cm in length. The pods and seeds are edible, but when the legume is mature, the beans alone are used. The sample purchased at Paco market were harvested from Tanauan, Batangas. The young pods and seeds were used in sampling.

PAPAYA (*Papaya*).—Green papaya is one of the commonest vegetable fruits in the Filipino diet. It is prepared boiled, sautéed, or pickled. Sampling consisted of several green fruits purchased at Pasay market with an average measurement of 16 by 18 cm.

CUCUMBER (*Pepino*).—This vegetable fruit was purchased at Quiapo market and weighed more than half a kilogram. The fruit is long and cylindrical and is usually thinly sliced crosswise and eaten raw as a salad. Sample (*b*) which was salted cucumber with the stem on was purchased at Chinatown.

BLUE PEA (*Pukinggan*).—The pods came from Urdaneta, Pangasinan. About a kilogram of the legume was sampled. The pods measured 6 to 11 cm long and 1 cm wide, were flat, and contained 6 to 10 seeds. Both the pods and seeds were used in sampling. The very tender pods and young tips of blue pea are best for vegetable dishes.

GOA BEAN (*Sigidillas*).—The plant is a climbing vine and is cultivated for its edible pods. The tender pods are most desirable as a vegetable alone or with meat and fish dishes. The pods measured 10 to 20 cm long, about 2 cm thick and 4-winged—the wings, about 5 mm wide, were uneven at the margin.

YAM BEAN POD (*Sinkamas*).—This is a widely cultivated vine with large, fleshy, edible roots. The young pods are also used as a vegetable. The pods sampled were 8 to 10 cm long and 10 to 15 cm wide and contained 8 to 10 seeds. The sample was obtained from Sta. Lucia, Ilocos Sur.

CHILI PEPPER (*Siling labuyo*).—The plant is found throughout the Philippines and its fruit is extensively used as a condiment due to its sharp taste. Sample (*a*) measured about 2.5 cm while sample (*b*) measured 7 mm in length. The fruits were mostly bright red in color with a few that were yellowish green. Both samples contained numerous seeds.

YARD LONG BEAN (*Sitaw*).—A popular and an all-year round legume. When tender, both the pods and beans are edible. The pods are slender measuring 25 to 35 cm long and enclose 9 to 12 seeds. Sample (*a*) consisted of the green variety while (*b*) consisted of the purple-colored pods.

EGGPLANT (*Talong*).—About a kilogram of the long cylindrical fruits was sampled. The fruits measured about 4 by 20 cm and weighed 100 to 150 gm. These were purchased at Pasay City market.

4. VEGETABLE ROOTS, BULBS AND TUBERS

WATER CHESTNUT (*Apulid*).—These are small bulbs varying in diameter from 0.5 to 1.5 cm. The skin is rough, hard, and dark reddish brown and encloses a white delectable meat which is popularly used in many vegetable dishes. About a kilogram of *apulid* purchased at Divisoria market was used in sampling.

BIRD OF PARADISE (*Paraiso*).—This is a garden plant grown for its bright orange-colored flowers. However, when food is scarce, it is reported that the roots are used as food.

GARLIC (*Bawang*).—The bulb measures 3 to 5 cm long and 1 to 3 cm wide, and consists of several segments, each of which is covered by a thin, light-colored membrane. Garlic is one of the spices that is commonly used in the preparation of Filipino dishes.

TARO (*Gabi*).—Taro is cultivated for its large corm which is a staple food in some localities. Both the leaves and petioles are also edible. The sample was purchased at Pasay City market and consisted of assorted sizes measuring 6 to 8 cm by 4 to 5 cm. It is eaten boiled, candied or prepared with coconut milk.

CASSAVA (*Kamoteng kahoy*).—The plant is widely cultivated for its fleshy starchy roots which, in certain sections of the country, constitute a major food item. The plant is a half-woody shrub. The leaves are alternate, smooth and divided at the base into 3 to 7 segments. Occasionally, the young leaves are also used as food. Almost two kilos of the fleshy roots obtained from Ilocos Sur and varying in size from 15 to 32 cm long by 3 to 4 cm in diameter, was used in sampling.

GINGER (*Luya*).—The rhizomes of ginger are popular as a condiment and are used in the preparation of a local beverage called "salabat." This is an infusion of ginger to which sugar

and sometimes milk are added, and which is served in place of coffee or tea.

TURMERIC (*Luyang dilaw*).—This fleshy, tuberous, and aromatic rootstock is widely distributed, but is cultivated only to a limited extent. When dried and grounded, the tuber furnishes the turmeric of commerce. This root is used in preparing pickles and for flavoring some Filipino dishes.

LUZON YAM (*Pakit*).—This branching, slightly flat tuber was obtained from Ilocos Sur and measured an average of 4 by 25 cm. The skin is thin and soft like that of potato with hairy spines sparsely but regularly distributed. It is eaten like potato.

POTATO (*Patatas*).—The sample, which was grown in Baguio, was purchased at Pasay City market. The average measure was 7 by 10 cm. The tubers are grown in high altitudes especially in the Mountain Province, Luzon, and in the Lanao region in Mindanao.

WHITESPOT ARUM (*Pungapung*).—This large corm came from Samar and weighed more than 0.75 kg. It had a diameter of 16 cm. Care was taken in removing the skin as the raphide crystals produce irritation upon contact with the skin. The corm is edible when thoroughly cooked.

ONION (*Sibuyas*).—Onion is almost an indispensable item in Filipino cookery. It is one of the ingredients in almost all sautéed dishes and stews. The imported variety was sampled in (*a*), with an average measure of 6.5 cm in diameter. Sample (*b*) came from Baguio with stalks and long leaves. Only the bulbs and part of the stem were used in sampling. The native onions were sampled in (*c*). These are smaller bulbs and most delectable for pickling.

TRIDENT YAM (*Tugi*).—The tubers have an average measure of 11 by 3.5 cm. The skin is thin and light brown with regularly arranged spines. Tugi is boiled in the same way as potatoes. This sample came from Sta. Lucia, Ilocos Sur.

GREATER YAM (*Ubi*).—The tubers are rounded or elongated with a rough dark brown skin but dark purple nearest the skin, and lightly colored towards the middle. The tuber is used boiled, candied, or prepared with coconut milk and sugar and served as dessert. It also makes delicious ice cream.

5. VEGETABLE FLOWERS

Himbabau.—The flowers are very small and crowded on slender, flowering branches about 7 to 14 cm long. The sam-

ple was purchased at Paco market and reported to have been harvested from Batangas.

SQUASH FLOWERS (*Kalabasa*).—These are large yellow flowers about 8 cm long, bell-shaped with a 5-lobed corolla. The flowers were purchased at Pasay City market.

SESBAN (*Katuray*).—*Katuray* is planted for its edible flowers and pods. The flowers are cooked in steam, and make an excellent salad. The flowers sampled were white, about 3 cm long. They were purchased at Paco market.

LILY FLOWERS—These are dried blossoms imported from China, but are peddled in our local market as banana flowers. These dried flowers are especially used in the preparation of a dish called "pinaksiw."

TAMARIND FLOWERS (*Sampalok*).—The racemes are usually axillary reaching a length of 5 to 10 cm. The petals are yellowish with pink stripes about 1 cm in length. The flowers, like the leaves and young pods of the tamarind, are used for seasoning foods such as "sinigang."

6. VEGETABLE SHOOTS AND STEMS

TARO PETIOLES (*Gabi, tangkay*).—Petioles of taro leaves reported in this paper were analyzed separately. Some people prefer to eat only the petioles.

BAMBOO SHOOTS (*Labong.*)—This is an inexpensive and very common food item found in our local market stalls. Usually it is sold already sliced and half cooked in water. Sample (*a*) was bought from Polo, Bulacan, already sliced and half cooked. Sample (*b*) was prepared from a whole young shoot which also came from Bulacan. The dried shoot sold by the Chinese was analyzed in sample (*c*).

MUSTARD ROOT (*Mustasa*).—This is the underground stem of the plant. The sample which was purchased at a Chinese grocery store was imported from Szechuan, China. It measured 6 to 8 cm wide and 10 to 12 cm long, and was shaped irregularly like ginger. The skin is green but the inside is whitish and juicy. It is especially used by the Chinese in preparing soups or meat dishes.

7. PULSES, NUTS AND SEEDS

KIDNEY BEAN (*Abitsuwelas*).—Three kinds of this bean are sold in the market: Samples (*a*) and (*b*) are the black variety which is used to a limited extent; (*c*) and (*d*) are the red variety and (*e*) and (*f*) are representative of the white bean.

The last two varieties are more commonly used in the preparation of mixed dishes, as a boiled bean sautéed with meat or shrimps or in the preparation of soup. The samples were purchased in the market. Analysis was made on the dry samples.

SOYBEAN (*Balatong*).—A large bulk of the soybeans consumed in the country today is imported. However, soybean is now grown in some parts of the Philippines and plans are being made to increase its production. The bean is commonly eaten roasted or boiled and is seldom used in the preparation of Filipino dishes.

SOYBEAN MILK.—Samples (*a*) and (*b*) were purchased from a local manufacturer. The latter sample is being sold in the market with chocolate added to vary the flavor.

Bean paste sampled in (*c*) is prepared by pounding beans which have been previously boiled until sufficiently soft. The paste is sold in the market as "miso." It turns darker and becomes rancid after a few days.

"Tahu" or "tojo" is the unpressed soybean curd (*d*). The method of preparation is almost the same as the method used in making "tokwa," but a smaller amount of the coagulating agent is used resulting in the formation of a very soft solid mass. This is being peddled by the Chinese in wooden pail-shaped containers and is served with a medium-thick brown syrup to give flavor to the almost tasteless "tojo."

Sample (*e*) is locally called "tahure." This is soybean curd which is prepared like "tokwa" and preserved in strong brine solution. It usually comes in the market in the form of about 8 cm cubes.

"Tausi" (sample *f*) is a fermented product prepared from dark soybeans. It is brownish in color and sold with the salty liquid in which the steamed beans were fermented.

BEAN CHEESE (*Tokwa*).—This product is sold in the market in the form of small cakes or in rectangular pieces, 8 by 8 by 20 cm. According to Adriano and de Guzman (1932), the Chinese method of making *tokwa* is as follows: "The soybeans are soaked in water until pronounced swelling has taken place; then they are ground by hand between millstones. The milky fluid flowing from the mill is poured into a large container in which there is boiling water. The mixture is heated for one hour until it coagulates into a white curd. Some manufacturers use *batong sunsong* or gypsum (mostly calcium sulfate) water to

hasten coagulation. The curd is made into cakes, 8 by 8 by 3 cm by folding it into a small piece of cloth and then pressing it in a hand press to expel as much of the water as possible. The cakes are left in press for about 30 minutes; when taken out, the cloth is removed, and the compressed cakes baked in a moderate oven until light brown. The inside of the cakes remain a creamy white." Four samples of *tokwa* are reported.

CHICKPEA (*Garbansos*).—The Philippines is not well adopted to the cultivation of this bean and whatever amount is consumed in the Filipino dietary is all imported. Chickpea is especially used in the preparation of Spanish dishes. The two samples analyzed were purchased in the market.

Kamansi.—The entire fruit is described under vegetable fruits in this report. The seeds may be eaten boiled or roasted.

CHESTNUT (*Kastanyas*).—Chestnut is imported from China and is a favorite nut in Manila and its suburbs. Consumption is however limited due to its prohibitive price. It is sold in the market and grocery stores boiled, oven roasted, or roasted on charcoal. Boiled nuts were used in preparing the sample for analysis.

CASHEW NUT (*Kasuy*).—The seed of the cashew fruit is kidney-shaped and is peculiarly situated on top of a large, soft, yellow, fleshy, juicy, pear-shaped fruit. The kernel has an excellent flavor when roasted and is regarded as a delicacy.

JACKFRUIT SEED (*Langka*).—The seeds of the fruit are utilized by boiling in slightly salted water. They have no commercial value. Boiled seeds were used in preparing the sample.

PEANUT (*Mani*).—Several samples of peanuts have been reported in the previous paper. Sampled in (*a*) were the raw peanuts purchased at Pasay City market. Sampled in (*b*) were the same peanuts after boiling. Samples (*c*) and (*d*) were roasted peanuts analyzed with and without skin.

MUNG BEAN (*Munggo*).—The bean is widely cultivated and extensively eaten boiled or in stews and makes an excellent soup. The seeds measure about 4 to 6 mm, green colored and hard. Thy are usually soaked in water several hours prior to boiling. The red-colored bean was sampled in (*c*). Sample (*d*) was sprouted mung bean locally known as "toge."

SPORT COCONUT (*Makapuno*).—This is a variety of coconut in which the meat is much thicker and more starchy than in the ordinary coconut (below) and which makes a very delicious dessert when prepared in syrup.

COCONUT (*Niyog*).—Coconut is extensively planted for "copra," or dried coconut meat. Its use as a food is regional but as a whole, coconut is quite popular. Sample (*a*) is the meat of the ripe coconut which is usually utilized only for the coconut milk it contains. When the meat is grated and squeezed, it gives the white milk which is sampled in (*b*). This is used as a sauce in the preparation of many Filipino dishes or in the making of desserts. The cotyledon of coconut is present when the nut is fully mature and as the coconut ages, the cotyledon grows larger. The small-sized cotyledons are especially delectable and make good dessert when candied. Sample (*c*) was prepared from the medium-sized cotyledons.

COWPEA (*Paayap*).—The matured dried seeds of cowpea were used in making the analysis. The young pods are described under the section on Fruits and Legumes of this paper.

LIMA BEANS (*Patani*).—Sampling was done on the ripe seeds which were sold in the market without the pods. The seeds measured almost 2 by 3 cm. The thick seed covering was removed prior to making the slurry. The seeds are usually eaten as a green bean or before they become hard and dry.

PILI NUT (*Pili*).—The seed comes with an elongated and pointed hard covering measuring about 2 by 5 cm and inclosing a similarly-shaped kernel that is both delicious and excellent in flavor. The sample came from Legaspi City.

RESULTS AND DISCUSSION

Results of the analyses of 167 samples of fruits, vegetables, and pulses, nuts, and seeds are sumarized in Table 1. The vegetables studied include the leaves; fruits and legumes; roots, bulbs, and tubers; flowers; and shoots and stems. The values reported are the amounts of food nutrients present in 100 grams of the raw edible portion.

Some of the foods studied have already been analyzed and reported in the first paper. It is of interest to compare the variation in their composition. A number of foods in Table 1, represented by two or more samples, were obtained from different sources, were of different varieties or represented several stages of maturity. Considerable variation in the values of some nutrients indicates that differences in botanical species, soils, fertilizers used, and climate may affect the nutrient value of foods. Our results indicate that further analysis of foods grown under different conditions must be made before

representative values for the various nutrients of Philipppine foods can be obtained.

Foods that gave relatively high values in some of the food nutrients are indicated in the following discussion. The rating of the vitamin and mineral contents of foods is based on the scale used by the Institute of Nutrition (Table 2).

Nitrogen.—The food richest in nitrogen content (expressed in gm/100 grams) in Table 1 are those that come under pulses, nuts, and seeds principally soybean, 6.0; mung bean, 3.8; kidney bean, 3.8; cashew nut and cowpea, 3.5; chickpea, 3.1; peanut, 2.9; and pili nut, 2.2. With the exception of soybean, the nutritional quality of their proteins has not been studied. However, legume proteins are generally superior to cereal proteins; hence they have been called "meat extenders."

Calcium.—Due to the lack of good sources of calcium in the Filipino diet, this mineral has been usually found inadequate. Popular foods found to contain an excellent amount of calcium (in mg/100 grams) were: taro leaves, 409; spinach, 375; *kulitis,* 342; bitter melon tops, 288; *himbabau* flowers, 277; *malunggay* leaves, 270; soybeans, 246; chickpeas, 120; mung beans, 118; kidney beans, 110; and pods of yam bean (*sinkamas*), 106. In general, fruits contain fair amounts of calcium, but since it is relatively easy to consume a hundred grams of fruits, these become good sources of calcium. The availability of calcium in foods may not be the same.

Iron.—The foods found to contain excellent amounts of iron (in mg/100 grams) were the following: *kulitis,* 31.3; seaweeds, 17.8; sweet potato tops, 10.4; garland crysanthemum (*tañgo*), 10.3; and soybeans, 10.0. Good contents of iron were found in mung bean, 8.2; *asistasya,* 8.2; bitter melon tops, 6.9; kidney bean, 6.8; *dampalit,* 6.3; potherb, 6.0; leek, 6.0; and mustard leaves, 5.0.

Carotene.—The source of vitamin A of the Filipino dietary is dependent mostly on the provitamin A or carotene which is present in leafy green and yellow vegetables. From Table 1 excellent sources of carotene (mg/100 grams) were found in taro leaves, 14.19; *kulitis,* 7.72; pepper leaves, 6.68; chili, 6.60; *asistasya,* 5.67; *malunggay,* 5.52; mustard leaves, 5.31; bitter melon tops, 5.09; ripe mango, 4.18; purslane, 4.00; sweet potato top, 3.61; and garland chrysanthemum, 3.20. Assuming a conversion of 0.6 mcg carotene for one International Unit of

vitamin A, the foods mentioned above contain 5,000 I. U. and over per 100 grams of the raw edible portion.

Thiamine.—The foods found to be excellent in thiamine content (mg/100 grams) were mung bean, 0.8; peanut, 0.8; kidney bean (black), 0.8; soybean, 0.5; pigeon pea, 0.5; pepper leaves, 0.5; chili, 0.4; kidney bean (white), 0.4; and cashew nut, 0.4. Other good sources for this vitamin were kidney bean, 0.3; chestnut, 0.3; cowpea tops, 0.3; garland crysanthemum, 0.2; and goa bean, 0.2.

Riboflavin.—The foods that contain about 0.5 mg of riboflavin per 100 grams and which may be considered excellent sources of this vitamin were bitter melon tops, taro leaves, *malunggay* leaves and chili. Considered as good sources were *kulitis,* pepper tops, *himbabau* flowers, lily blossom, cashew nut, and mung bean. These foods contain 0.3 to 0.4 mg riboflavin per 100 grams.

Niacin.—Most outstanding sources for niacin from Table 1 was peanut, 8.2 mg per 100 grams. Other good sources were *malunggay* leaves, 3.3; chili, 2.5; potato, 2.5; mung bean, 2.4; fern, 2.4; kidney bean, 2.1; taro leaves, 2.1; pigeon pea, 1.9; *kulitis,* 1.8; pepper tops, 1.8; guava, 1.7; swamp cabbage, 1.6; spinach, 1.5; bitter melon tops, 1.5; and soybean, 1.5. Among the vegetable flowers, lily blossom and sesban contain more than 3 mg of niacin.

Vitamin C.—A large number of foods were found to be exceptionally high in vitamin C content; *malunggay* pods, 331 mg/100 grams; blue peas, 248; *kasuy* fruit, 234; bitter melon tops, 170; taro leaves, 161; guamachil, 156; guava, 150; *himbabau,* 141; *kulitis,* 120; *malunggay* leaves, 133;; papaya, 112; cauliflower, 107; coriander, 105; malabar nightshade, 100; Chinese cabbage, 94; leek, 94; mango, 80; cabbage, 73; and chili, 70.

TABLE 1.—*Composition of Philippine foods.*

Local name (T., I., or V)*	Scientific name	English name	Edible portion	Representative values per 100 gm edible portion												
				Moisture	Nitrogen	Ether extract	Ash	Crude fiber	Calcium	Phosphorous	Iron	Carotene	Thiamine	Riboflavin	Niacin	Ascorbic acid
			gm	*gm*	*gm*	*gm*	*gm*	*gm*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*
I. FRUITS:																
(a) Abokado, pula	*Persea americana* Mill.	Avocado (purple skin)	69.4	86.4	.126	7.23	.56	1.2	6.4	23.3	.83	.017	.058	.061	1.00	9.6
(b) Abokado, berde	do	Avocado (green skin)	61.1	86.6	.152	5.57	.66	1.5	3.6	13.4	.61	.076	.055	.082	1.08	9.8
(a) Bayabas	*Psidium guajava* L.	Guava	99.2	75.6	.267	1.12	.78	10.4	31.8	39.7	1.39	.040	.077	.053	1.56	92.5
(b) Bayabas	do	do	98.9	79.9	.235	.66	------	7.8	------	------	------	.052	.056	.051	1.81	196.3
Buli	*Corypha elata* Roxb.	Buri palm	16.5	82.4	.113	.12	.40	1.2	10.7	14.7	tr	------	.014	.022	.49	------
(a) Dayap	*Citrus aurantifolia* (Cristm.) Swingle	Lime	77.0	91.0	.081	2.35	.18	.3	13.0	11.2	tr	.009	.028	.020	.13	46.2
(b) Dayap, balat	do	Lime rind	------	74.5	.312	.12	1.18	3.9	215.1	31.9	.62	.108	.092	.076	.48	67.5
Duhat	*Syzygium cumini* (L.) Skeels	Java plum, Black plum	67.8	84.8	.099	.13	.33	.3	13.9	11.8	.15	0	.007	.018	.31	------
Granada	*Punica granatum* L.	Pomegranate	44.2	75.5	.251	.125	1.00	.9	15.4	43.3	.87	------	.087	.014	.40	4.0
(a) Kaimito, berde	*Chryso phyllum caito* L.	Star apple, green	49.4	84.1	.132	1.02	.35	.8	19.8	16.4	.52	0	.013	.033	.90	9.3
(b) Kaimito, murado	do	Star apple, purple	62.8	80.5	.213	.43	.25	------	14.3	8.8	.24	tr	.011	.011	.88	5.5
Kamatsili	*Pithecolobium dulce* (Roxb.) Benth	Guamachil	54.4	79.6	.513	.24	.53	1.1	10.0	35.8	.35	0	.199	.107	.41	156.3
Kamyas	*Averrhoa bilimbi* L.	Bilimbi	99.7	94.6	.133	.21	.33	.6	7.4	12.2	.29	.116	.008	.046	.24	9.7
Kasuy	*Anacardium occidentale* L.	Cashew	------	86.2	.132	.28	.25	.3	1.4	12.1	.51	.022	.010	.009	.47	234.0
Katmon	*Dillenia Philippinensis* Rolfe	Philippine dillenia	41.9	93.1	.048	.20	.22	.9	28.4	5.5	.11	.026	.024	.041	.24	1.9
Langka	*Artocarpus heterophyllus* Lam.	Jackfruit	90.1	74.5	.247	.31	.87	.7	25.3	14.6	.72	.075	.126	.069	.70	2.7
(a) Limon	*Citrus limonia* Osbeck	Lemon	56.1	91.5	.070	1.88	.27	.2	6.7	6.2	tr	.002	.035	.022	.12	55.3
(b) Limon, balat	do	Lemon, rind	------	82.4	.280	.27	.54	1.9	10.9	15.7	.87	.011	.065	.126	.47	256.4
Litsiyas	*Lichi chinensis* Sonn	Litchi	62.9	80.0	.147	.09	.33	.3	7.6	25.4	.14	tr	.022	.036	.57	13.8
Mabulo	*Diospyros discolor* Willd	Ebony	53.8	83.0	.076	.29	.76	1.6	34.4	21.4	.75	0	0	.042	.29	21.6
Makopa	*Syzygium malaccense*	Curacao-apple	89.3	91.1	.066	.10	.24	.9	15.2	7.7	.23	0	.029	.018	.29	15.0

* T., stands for Tagalog; I, Ilocano; and V., Visaya.

TABLE 1.—*Composition of Philippine foods*—Continued.

Local name (T., I., or V)*	Scientific name	English name	Edible portion	Representative values per 100 gm. edible portion												
				Moisture	Nitrogen	Ether extract	Ash	Crude fiber	Calcium	Phosphorous	Iron	Carotene	Thiamine	Riboflavin	Niacin	Ascorbic acid
			gm	*gm*	*gm*	*gm*	*gm*	*gm*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*
(a) Mangga, kalabaw (hilaw)	*Mangifera indica* L.	Mango	75.4	82.8	.095	.11	.51	.3	10.4	21.9	.32	.120	.095	.048	.24	72.8
(b) Mangga, pahutan	do	do	48.0	79.0	.169	.48	.44	.3	7.7	10.4	.26	1.147	.125	.155	.90	26.7
(c) Mangga, piko (hilaw)	do	do	75.2	82.3	.099	.06	.32	.5	13.1	10.5	.35	.082	.039	.042	.32	80.5
(d) Mangga, piko (hinog)	do	do	59.4	82.7	.154	.08	.38	.4	10.1	13.6	.54	4.179	.073	.085	.67	40.0
(a) Mansanas, berde	*Pyrus malus* L.	Apple, green	80.7	86.6	.066	.06	.21	.7	9.9	2.1	tr	.018	.014	.031	.15	tr
(b) Mansanas, pula	do	Apple, red	67.2	83.4	.033	.12	.30	.7	7.7	8.7	.13	.013	.019	.015	.13	tr
Milon, kastila	*Cucumis melo* L.	Spanish melon, Cantaloupe	59.0	90.0	.071	.06	.48	.3	5.7	22.8	.17	1.808	.035	.023	.80	50.9
Milon, tagalog	do	Melon	71.3	95.5	.102	.04	.44	.4	22.6	12.7	.32	.043	.022	.020	.30	16.2
Papaya	*Carica papaya* L.	Papaya	54.0	85.8	.099	.06	.58	.6	15.8	7.4	.40	.285	.042	.034	.39	111.9
Pasyonaryang mabaho	*Passiflora foetida* L.	Stinking passion flower	60.3	------	------	------	1.18	------	9.5	60.3	.78	------	.002	.077	------	------
(a) Pinya	*Ananas comosus* (L.) Merril.	Pineappple, native	27.6	85.1	.074	.24	.27	.5	17.8	5.0	.13	.017	.098	.044	.17	8.1
(b) Pinya	do	Pineapple, Hawaiian	80.3	84.8	.062	.08	.55	.5	39.7	10.2	.12	.016	.077	.030	.21	15.9
(c) Pinya	do	Pineapple, native	51.1	84.6	.560	.68	.29	.5	17.9	5.0	.15	.008	.103	.026	.23	38.9
(a) Saguing, bunguian	*Musa sapientum* L.	Banana	58.2	70.1	.149	.43	.66	.3	10.8	15.5	.50	.059	.033	.029	.66	26.3
(b) Saguing, saba	do	do	53.5	62.6	.177	.47	.79	.4	20.9	34.8	.57	.111	.076	.055	.64	41.9
(c) Saguing, ternate	do	do	61.0	64.8	.181	.26	.97	.3	11.7	28.9	.74	.568	.029	.038	.73	8.8
(d) Saguing, ternate	do	do	57.0	66.5	.191	.07	.65	.2	10.9	22.7	.80	.581	.051	.024	.61	20.0
Sampalok, hinog	*Tamarindus indica* L.	Tamarind, ripe	33.1	55.3	.275	.25	1.31	1.0	68.1	44.4	.59	0	.258	.094	.78	5.7
Serale	*Flacourtia ramontchi* L'Her	Governor plum	50.0	78.7	.062	.66	.36	.9	22.5	11.9	.16	.012	.010	.028	.36	4.9
Suha	*Citrus maxima* (Brown) Merr il	Pomelo	41.9	90.2	.082	.16	.37	.3	14.1	14.3	.63	.012	.035	.015	.20	61.6
Susung kalabaw	*Uvaria rufa* Blume		58.4	65.5	.124	.52	.42	18.4	20.5	11.7	.43	tr	.083	.025	.60	10.5
Tiyesa	*Lucuma nervosa*ADC	Canistel, Tiesa	74.7	56.7	.042	.55	.53	------	29.7	23.0	.85	.205	.018	.045	.38	49.5
Tsiko-mamey	*Anchras sapota* L.	Ponderosa	87.0	75.8	.069	.37	.40	1.2	21.7	3.3	tr	0	.005	------	.14	12.4

* T., stands for Tagalog; I, Ilocano; and V., Visaya.

TABLE 1.—*Composition of Philippine foods*—Continued.

Local name (T., I., or V) *	Scientific name	English name	Edible portion	Representative values per 100 gm edible portion												
				Moisture	Nitrogen	Ether extract	Ash	Crude fiber	Calcium	Phosphorous	Iron	Carotene	Thiamine	Riboflavin	Niacin	Ascorbic acid
2. VEGETABLE LEAVES:			*gm*	*gm*	*gm*	*gm*	*gm*	*gm*	*gm*	*gm*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*
Alagaw	*Premna odorata* Blanco	Fragrant premna	24.3	80.0	.563	.39	1.43	2.6	64.2	76.0	2.99	------	.043	.233	1.09	5.3
(a) Ampalaya, talbos	*Momordica charantia* L.	Bitter melon tops	46.5	86.8	.738	.85	1.66	1.3	280.2	54.7	6.85	4.592	.123	.374	1.25	130.0
(b) Ampalaya, talbos	------do------	------do------	52.7	82.5	1.042	.47	2.61	1.8	297.0	53.0	3.27	5.575	.141	.549	1.85	210.0
Asistasya	*Asystasia gangetica* (L.) T. Anders			87.2	.647	1.37	1.93	1.5	235.4	34.6	8.21	5.675	.155	.184	1.12	26.2
Bawang	*Allium sativum* L.	Garlic	82.6	88.0	.336	.46	.81	1.7	98.5	42.1	.24	1.492	.094	.210	.65	44.2
Dampalit	*Sesuvium portulacastrum* A.C. Ag.			89.7	.269	.34	2.30	.8	72.7	22.6	6.34	1.571	.032	.126	.44	32.5
Gabi	*Colocasia esculentum* var.(L.)Schott	Taro leaves	76.2	79.4	1.031	2.22	2.21	1.9	409.1	51.4	1.21	14.192	.187	.489	2.06	161.0
Gulamang-dagat	*Digenea simplex* Wulf	Seaweed		89.6	.319	.06	5.11	.4	30.1	15.8	17.77	1.489	.037	.122	.66	4.7
Himbabau	*Alloenthus luzonicus* (Blanco) F.Vill			80.4	.882	1.14	1.83	2.8	265.2	70.5	3.71	------	.154	.360	1.31	141.8
Ispinankang Bagiuo	*Tetragonia expansa* Murr.	New Zealand Spinach	40.8	88.6	.648	.46	2.16	1.0	375.9	68.0	2.48	7.643	.031	.188	1.49	36.3
Kalabasa	*Cucurbita maxima* Duchesne	Squash tops	39.2	87.8	.731	1.10	1.55	1.6	108.8	69.0	.66	2.365	.176	.182	1.22	21.8
(a) Kamote, talbos	*Ipomoea batatas* (L.) Poir.	Sweet potato tops	28.2	87.1	.566	.67	1.59	1.4	81.2	67.3	10.37	3.609	.065	.173	.94	25.0
(b) Kamote, talbos	------do------	------do------		82.8	.592	.81	1.35	1.5	64.0	66.3	5.82	------	.169	.297	.89	28.8
Kamoteng kahoy	*Manihot esculenta* Crantz	Cassava leaves	14.8	81.9	1.183	1.67	1.46	2.1	124.3	31.8	5.64	10.774	.270	.342	1.74	265.6
Kangkong	*Ipomoea aquatica* Forsk	Swamp cabbage	54.7	90.3	.626	.51	1.08	1.1	53.3	64.1	4.54	2.477	.114	.273	1.56	60.2
Kintsay	*Apium graveolens* L.	Chinese celery		92.1	.252	.39	1.81	1.5	214.9	31.9	.82	.825	.055	.106	.67	36.7
(a) Kulitis	*Amaranthus viridis* L.	Spineless amaranth		85.2	.902	1.02	2.57	1.1	342.5	83.6	------	9.057	.004	.306	1.97	168.2
(b) Kulitis	------do------	------do------	47.4	84.3	.773	.55	2.39	1.0	340.0	68.2	31.13	6.372	.006	.431	1.70	168.8
Kutsay	*Allium porrum*-L.	Leek	74.5	91.0	.310	.84	.92	1.6	60.7	60.0	5.97	2.266	.026	.058	.91	93.7
Libato, Alugbati	*Basella rubra* L.	Malabar nightshade		90.7	.348	.37	1.21	.6	120.1	29.8	.53	2.741	.069	.189	.59	100.0

* T., stands for Tagalog; I., Ilocano; and V., Visaya.

TABLE 1.—*Composition of Philippine foods*—Continued.

Local name (T., I., or V) *	Scientific name	English name	Edible portion	Representative values per 100 gm edible portion												
				Moisture	Nitrogen	Ether extract	Ash	Crude fiber	Calcium	Phosphorous	Iron	Carotene	Thiamine	Riboflavin	Niacin	Ascorbic acid
			gm	*gm*	*gm*	*gm*	*gm*	*gm*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*
Malunggay	*Moringa oleifera* Lam.	Horse-radish tree	------	81.0	1.140	.96	1.97	1.4	268.9	75.6	1.07	5.522	.171	.470	3.32	113.0
Mustasa	*Brassica integrifolia* (West) O.E. Schultz	Mustard leaves salted	100.0	79.3	.286	1.11	11.2	1.8	341.8	26.8	5.03	.536	.020	.091	.52	6.4
(a) Olasiman	*Portulaca oleracea*	Purslane	------	90.2	.342	.53	1.88	1.0	102.7	41.2	31.39	3.164	.042	.106	.90	55.7
(b) Olasiman	------do------	------do------	35.7	84.8	.501	.54	2.07	1.2	166.8	30.5	.65	4.831	.083	.217	1.12	68.8
Pako	*Athyrium esculentum* (Retz.) Copel.	Fern	38.3	90.5	.712	.44	1.23	.9	22.7	20.4	.10	3.049	0	1.29	2.42	7.8
Papaya	*Carica papaya* L.	Papaya leaves	71.0	75.4	1.283	2.01	2.70	1.8	352.7	63.3	.77	10.949	.152	.883	2.12	139.5
(a) Petsay, tagalog	*Brassica chinensis* L.	Chinese cabbage	84.6	91.6	.281	.21	.90	.9	124.5	25.6	.42	2.178	.110	.108	1.00	94.1
(b) Petsay, (Wongbok)	------do------	------do------	88.5	95.1	.326	.10	.64	.6	59.3	103.1	.93	.158	.046	.053	.65	23.4
(a) Repolyo	*Brassica oleracea* var. *capitata* L.	Cabbage	90.9	91.2	.295	.06	.69	1.0	68.2	27.2	.14	.052	.044	.051	.33	73.1
(b) Repolyo murado	------do------	Cabbage, purple	88.2	89.6	.306	.04	.63	.9	31.6	20.4	.97	.036	.085	.052	.39	45.6
(c) Repolyo murado	------do------	------do------	85.2	92.2	.247	.07	.52	.3	33.3	22.1	.20	.206	.069	.052	.29	40.3
(a) Sili, talbos	*Capsicum frutescens* L.	Chile tops	39.8	84.6	.716	1.07	1.85	1.2	33.2	52.2	1.35	6.555	.255	.269	1.53	49.7
(b) Sili, talbos	------do------	------do------	47.7	84.5	1.030	.94	2.18	1.4	210.4	49.4	1.72	6.251	.406	.333	1.64	15.1
(c) Sili, talbos	------do------	------do------	35.8	78.8	1.242	1.11	2.45	1.4	264.2	59.2	1.10	7.252	.780	.420	2.35	104.6
Sitaw	*Vigna sinensis* var. *sesquipedalis* Fruw.	Yard long bean	46.7	88.6	.705	.27	1.00	1.7	82.8	66.0	3.18	1.655	.288	.241	1.24	41.4
(a) Talinum	*Talinum triagulare* (Jacq.) Willd.	Potherb	33.6	91.5	.239	.51	1.17	.6	105.9	22.5	7.54	2.251	.060	.156	.63	71.0
(b) Talinum	------do------	------do------	66.7	93.3	.362	.48	1.34	.6	74.8	20.2	2.10	3.719	.125	.237	.46	57.8
Tañgo	*Chrisanthemum coronarium* L.	Garland crysanthemum	80.3	93.7	.349	.35	1.27	.6	82.0	------	10.31	2.915	.095	.220	.67	28.9

* T., stands for Tagalog; I., Ilocano; and V., Visaya.

TABLE 1.—*Composition of Philippine foods*—Continued.

Local name (T., I., or V.) *	Scientific name	English name	Edible portion	Representative values per 100 gm edible portion												
				Moisture	Nitrogen	Ether extract	Ash	Crude fiber	Calcium	Phosphorous	Iron	Carotene	Thiamine	Riboflavin	Niacin	Ascorbic acid
			gm	*gm*	*gm*	*gm*	*gm*	*gm*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*
Uray	*Amaranthus spinosum* L.	Thorny amaranth	22.0	86.8	.781	.57	2.50	1.2	475.9	70.7	2.20	6.654	.006	.343	1.06	82.3
Wansuy	*Coriandrum sativum* L.	Coriander	76.0	89.2	.373	.54	1.34	1.1	222.3	24.8	4.47	2.434	.081	.238	1.16	105.2
3. VEGETABLE FRUITS AND LEGUMES:																
Kadyos	*Cajanus cajan* (L.) Millsp.	Pigeon pea	56.3	61.5	1.440	.68	1.55	3.6	79.2	711.5	2.21	.171	.463	.165	1.85	32.1
Kalabasa	*Cucurbita maxima* Duch.	Squash	68.7	83.7	.265	.12	.82	.7	16.3	31.7	.19	1.164	.072	.030	1.09	19.0
Kamansi	*Artocarpus camansi* Blanco	------	52.2	87.1	.329	.72	1.05	2.2	59.3	46.1	tr	.027	.117	.065	1.92	20.8
Kamatis	*Lycopersicum esculentum* Mill.	Tomato	85.1	93.5	.178	.17	.54	.9	6.2	20.2	.92	.714	.055	.052	.65	35.9
Kundol	*Benincasa hispida* (Thumb.) Cogn.	Wax gourd	78.0	96.1	.044	.04	.26	.6	18.7	15.6	.29	0	.029	.105	.17	19.4
Labanos	*Raphanus sativus* L.	Radish	93.4	89.9	.409	.54	.41	1.4	76.4	26.3	.37	.264	.076	.072	.60	96.9
Langka, hilaw	*Artocarpus heterophyllus* Lam.	Jackfruit, unripe	53.5	85.8	.252	.52	.72	2.8	45.7	12.5	.13	tr	.191	.031	.32	13.1
Malunggay	*Moringa oleifera* Lam.	Horse-radish pods	50.8	87.6	.415	.29	.88	1.2	30.9	52.0	.85	.048	.056	.106	.67	331.3
Paayap	*Vigna sinensis* (L.) Savi	Cowpea (short var.)	62.8	87.9	.612	.24	.73	2.2	78.9	55.7	.35	.602	.175	.151	1.25	41.4
Papaya, hilaw	*Carica papaya* L.	Papaya	62.3	92.8	.131	.06	.53	.9	58.6	26.3	.31	0	.011	.024	.22	21.9
Pepino	*Cucumis Sativus* L.	Cucumber	------	95.9	.122	.20	.29	.5	16.2	13.0	.23	0	.029	.039	.22	12.2
Pepino	------do------	Cucumber, salted	100.	72.8	.709	.41	13.03	1.5	83.1	56.4	.47	.017	.005	.083	.56	2.6
Pukinggan	*Clitoria ternatea* L.	Blue pea	93.6	80.0	.604	.40	.80	4.8	40.3	24.2	.45	.671	.044	.179	1.43	247.7
Sigidillas	*Psophocarpus tetragonolobus* (L.) DC	Goa bean, Winged bean	95.5	89.6	.468	.14	.83	1.6	56.7	36.1	.11	.349	.229	.126	1.20	19.5
Sili, labuyo	*Capsicum frutescens* L.	Chili pepper	84.9	55.3	1.432	1.13	2.80	21.8	58.4	103.9	3.01	7.044	.283	.679	2.37	66.3
Sili, labuyo	------do------	do	------	58.3	1.143	2.57	2.41	19.1	114.3	137.4	4.13	6.194	.459	.348	2.62	73.0
Sinkamas	*Pachyrrhizus erosus* (L.) Urb.	Yam bean	84.5	84.2	.452	.22	.90	2.9	106.2	39.5	1.43	0	.192	.120	1.09	------

* T., stands for Tagalog; I., Ilocano; and V., Visaya.

TABLE 1.—*Composition of Philippine foods*—Continued.

Local name (T., I. or V.)*	Scientific name	English name	Edible portion	Representative values per 100 gm edible portion												
				Moisture	Nitrogen	Ether extract	Ash	Crude-fiber	Calcium	Phosphorous	Iron	Carotene	Thiamine	Riboflavin	Niacin	Ascorbic acid
			gm	*gm*	*gm*	*gm*	*gm*	*gm*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*
(a) Sitaw, berde	*Vigna sinensis* var. *sesquipedalis* Fruw	Yard long bean	84.6	89.2	.455	.12	.60	1.4	28.0	37.8	.04	.260	.130	.160	1.01	22.5
(b) Sitaw, murado	do	do	85.8	88.4	.530	.16	.62	2.0	59.6	52.1	.61	.224	.126	.105	1.12	20.0
Talong	*Solanum melongewa* L.	Eggplant	92.7	92.7	.204	.41	.52	.8	19.0	18.3	.08	.100	.088	.066	.51	4.9
4. ROOTS, BULBS AND TUBERS:																
Apulid	*Eleocharis dulcis* (Burmf.f.) Trin.	Water chestnut	46.1	76.9	.283	.67	.82	.6	10.5	52.2	.43	------	.024	.007	.94	9.2
Bawang	*Allium sativum* L.	Garlic	94.6	64.8	.098	.63	.63	.6	11.3	96.7	.52	0	.184	.040	.27	8.3
Gabi	*Colocasia esculentum* (L.) Schott	Taro	76.8	68.1	.174	.18	1.02	.3	24.0	53.6	.72	0	.082	.030	.83	14.0
Kamoteng kahoy	*Manihot esculenta* Crantz	Cassava, Manioc Tapioca plant	75.9	67.5	.081	.27	.90	.8	9.9	37.6	.46	------	.039	.016	.59	37.2
Luya	*Zingiber officinale* Rosc.	Ginger	75.2	93.6	.089	.67	.61	.7	31.3	27.4	2.16	0	.010	.029	.40	4.9
Luya, dilaw	*Curcuma longa* L.	Turmeric	77.6	88.2	.192	1.76	.88	.9	26.7	63.8	2.27	0	.017	.029	.54	tr
Pakit	*Dioscorea luzonensis* Schauer	Luzon yam	77.0	74.7	.396	.07	.61	.4	60.2	40.7	.74	------	.108	.021	.74	17.8
Paraiso	*Strelitzia reginae*	Bird of paradise	87.5	91.9	.056	.07	.93	1.6	44.7	22.1	.95	------	.008	.034	.12	------
Patatas	*Solanum tuberosum* L.	Potato	89.0	83.7	.422	.02	.54	.5	9.5	44.1	.66	0	.125	.032	2.52	34.4
Puñgapung	*Amorphophallus campanulatus* (Roxb.) Blume	Whitespot arum	91.3	75.0	.489	.15	.55	.7	15.0	35.8	.65	------	.051	.016	1.74	6.2
(a) Sibuyas, bombay	*Allium cepa* L.	Onion	95.4	91.2	.207	.20	.31	.4	15.9	27.5	.43	0	.036	.016	.11	6.0
(b) Sibuyas, Baguio	do	do	66.7	91.6	.211	.20	.40	.6	29.7	27.0	.40	0	.087	.046	.41	26.9
(c) Sibuyas, Tagalog	do	do	84.5	83.2	.346	.20	.63	.6	35.2	35.8	.41	0	.056	.023	.36	0
Tugi	*Dioscorea esculenta* (Lour.) Burk.	Trident yam	80.4	71.8	.192	.08	.84	.5	18.9	40.7	.48	------	.084	.016	1.07	17.2
Ubi	*Dioscorea alata* L.	Greater yam	90.1	76.6	.272	.05	.86	.6	10.4	41.2	.62	0	.090	.033	.47	2.4
5. VEGETABLE FLOWERS:																
Himbabau	*Alloenthus luzonicus* (Blanco)	----------	79.2	75.9	1.336	1.14	2.23	2.9	277.4	124.3	6.77	1.385	.178	.409	1.38	24.4

* T., stands for Tagalog; I, Ilocano; and V., Visaya.

TABLE 1.—*Composition of Philippine foods*—Continued.

Local name (T., I. or V.)*	Scientific name	English name	Edible portion	Representative values for 100 gm edible portion												
				Moisture	Nitrogen	Ether extract	Ash	Crude fiber	Calcium	Phosphorous	Iron	Carotene	Thiamine	Riboflavin	Niacin	Ascorbic acid
			gm	*gm*	*gm*	*gm*	*gm*	*gm*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*
Kalabasa	*Cucurbita maxima* Duch. (L.) Pers.	Squash flowers	59.1	93.6	.204	.23	.82	.6	88.1	40.1	3.11	.498	.052	.093	.94	25.9
Katuray	*Sesbania grandiflora* L.	Sesban	78.8	89.0	.289	.49	.49	1.3	17.8	27.1	.59	.058	.147	.119	3.39	58.8
"Saguing bulaklak"	*Hemerocallis fulva* L.	Lily flowers dried	92.0	17.8	1.518	1.46	4.98	5.2	275.3	189.8	26.61	.097	.081	.381	3.85	0
Sampalok	*Tamarindus indica* L.	Tamarind flowers	78.1	80.0	.454	1.54	.72	1.5	35.5	45.6	1.5	.310	.072	.148	1.14	13.8
6. VEGTABLE SHOOTS AND STEMS:																
Gabi	*Colocasia esculentum* var. (L.) Schott	Taro petioles	81.5	41.5	.122	.08	1.07	.7	56.9	22.0	.52	.364	.019	.040	.16	8.9
(a) Labong, partly cooked	*Bambusa spinosa* Roxb.	Bamboo shoots	100	94.3	.238	.48	.17	1.2	15.6	17.7	.05	0	.018	.026	.08	tr
(b) Labong, fresh	do	do	27.7	91.3	.359	.93	.65	.7	22.9	34.3	.19	------	.051	.076	.47	6.5
(c) Labong, dried	do	do	65.8	43.9	1.507	2.49	3.28	5.4	70.3	137.7	3.99	------	.010	.224	1.89	------
Mustasa	*Brassica integrifolia* West	Mustard root	100	72.0	.590	.96	14.64	2.1	182.6	92.7	2.18	.017	.031	.179	1.00	tr
7. PULSES, NUTS AND SEEDS:																
(a) Abitsuwelas, itim	*Phaseolus vulgaris* (L.)	Black kidney bean	100	11.5	3.753	1.17	3.16	4.3	85.6	383.8	6.90	------	.786	.239	2.03	------
(b) do	do	do	100	11.1	3.786	1.02	4.54	4.2	128.9	479.2	6.55	------	.829	.140	2.17	------
(c) Abitsuwelas, pula	do	Red kidney bean	100	12.1	2.946	1.48	3.21	3.5	111.2	342.1	6.97	0	.362	.167	2.02	tr
(d) do	do	do	100	11.2	3.621	1.42	2.86	3.5	108.2	308.4	6.43	------	.173	.187	2.29	
(e) Abitsuwelas, puti	do	White kidney bean	100	13.4	3.360	1.37	3.35	3.6	94.1	379.5	2.09	.002	.395	.024	1.96	9
(f) do	do	do	100	11.4	3.322	.90	3.23	3.7	144.1	349.6	7.52	0	.406	.272	2.39	0
Balatong, utaw	*Glycine max* (L.)	Soybean	100	11.6	6.038	17.60	4.76	4.6	245.8	508.9	10.00	0	.503	.237	1.47	tr

* T., stands for Tagalog; I, Ilocano; and V., Visaya.

TABLE 1.—*Composition of Philippine foods*—Continued.

Local name. (T., I. or V) *	Scientific name	English name	Edible portion	Representative values per 100 gm edible portion												
				Moisture	Nitrogen	Ether extract	Ash	Crude fiber	Calcium	Phosphorous	Iron	Carotene	Thiamine	Riboflavin	Niacin	Ascorbic acid
			gm	*gm*	*gm*	*gm*	*gm*	*gm*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*	*mg*	*gm*
SOYBEAN PRODUCTS:																
(a) Gatas ng utaw	*Glycine max* (L.)	Soybean milk	100	------	------	------	------	------	14.8	29.5	1.74	.018	.033	.018	------	------
(b) Gatas ng utaw may tsokolate	------do------	Soybean milk with chocolate	100	------	------	------	------	------	10.0	33.6	2.08	.026	.036	.026	------	------
(c) Miso	------do------	Soy bean paste	100	73.9	1.839	3.39	2.68	3.0	101.1	119.4	1.74	.008	.073	.095	.20	tr
(d) Tahu	------do------	Geerlig's cheese	100	93.0	.550	1.88	.46	------	114.3	37.9	.75	------	.064	.042	.14	------
(e) Tahure	------do------	Bean curd brain	100	63.2	1.487	5.01	22.36	------	105.0	97.6	3.17	------	.018	.022	.05	------
(f) Tausi	------do------	------do------	100	57.7	1.951	5.84	16.25	1.4	111.9	90.9	------	.016	.004	.245	1.10	4.0
(g) Tokwa	------do------	Soybean cake	100	77.2	2.088	7.11	1.56	------	149.6	143.3	2.70	0	.043	.029	.12	tr
(h) ------do------	------do------	------do------	100	78.5	2.300	6.78	.83	------	168.9	108.9	1.91	------	.039	.031	.07	------
(i) ------do------	------do------	------do------	100	77.9	2.492	6.61	------	------	------	------	------	0	.043	.032	.11	0
(j) ------do------	------do------	------do------	100	78.4	2,128	6.55	.81	------	138.8	103.7	.37	------	.044	.033	.14	0
(a) Garbansos	*Cicer arietinum* L.	Chick peas	100	11.4	3.083	6.20	3.13	2.6	96.0	400.0	4.00	.010	.164	.175	1.27	tr
(b) ------do------	------do------	------do------	100	11.3	3.256	6.33	2.95	2.4	120.0	327.1	1.34	.012	.090	.175	1.24	------
Kamansi, buto	------	------	36.2	83.0	.546	1.18	.51	.8	28.8	59.2	.33	.006	.135	.081	2.51	------
Kastanyas	*Castanea vulgaris* L.	Chestnut	75.4	34.3	.912	1.47	1.26	1.5	30.6	89.1	1.49	------	.262	.213	1.45	------
Kasuy, inihaw	*Anacardium occidentale* L.	Cashew, roasted	------	13.4	3.462	49.29	2.56	.7	32.1	411.3	3.93	------	.365	.342	1.43	tr
Lanka, buto	*Artocarpus heterophyllus* Lam.	Jackfruit seed	75.1	57.6	.895	.60	1.26	1.4	22.7	80.3	.82	------	.223	.064	.57	9.6
(a) Mani	*Arachis hypogoea*	Peanut	47.8	45.2	2.898	25.98	1.46	1.3	29.8	146.0	1.68	0	.882	.289	8.15	15.5
(b) Mani, linaga	------do------	Peanut, boiled	34.1	55.5	2.394	21.09	1.16	1.5	35.3	162.3	1.09	0	.414	.089	5.36	6.4
(c) Mani, binusa, may balat	------do------	Peanut, roasted with skin	53.7	15.9	4.919	45.24	2.79	2.3	43.8	358.4	1.20	0	.730	.259	13.83	13.0
(d) Mani, binusa, walang balat	------do------	Peanut without skin	51.1	8.5	5.859	51.81	2.62	1.9	53.0	426.2	1.21	0	.138	.093	12.76	8.3
(a) Munggo berde	*Phaseolus aureus*	Mung bean, green	100	8.7	3.905	.86	3.26	4.2	117.7	357.5	8.20	.053	.859	.333	2.39	7.6
(b) Munggo berde	------do------	------do------	100	12.9	3.661	.70	3.26	3.5	103.8	344.9	1.27	.071	.688	.200	1.79	10.3
(c) Munggo pula	------do------	Mung bean, red	100	13.5	3.220	.69	2.97	4.3	112.1	267.0	9.00	0	.406	2.43	2.28	7.4
(d) Toge	------do------	Mung bean, sprout	86.8	86.1	.975	.13	.56	.6	18.0	68.3	1.33	.016	.127	.148	1.14	30.6

* T., stands for Tagalog; I, Ilocano; and V., Visaya.

TABLE 1.—*Composition of Philippine foods*—Continued.

	Local name (T., I. or V)	Scientific name	English name	Edible portion	Representative values per 100 gm edible portion												
					Moisture	Nitrogen	Ether extract	Ash	Crude fiber	Calcium	Phosphorous	Iron	Carotene	Thiamine	Riboflavin	Niacin	Ascorbic acid
				gm	*gm*	*gm*	*gm*	*gm*	*gm*	*gm*	*gm*	*gm*	*gm*	*gm*	*gm*	*gm*	*gm*
	Makapuno	*Cocos nucifera* L.	Sport coconut	15.2	69.3	.317	18.89	------	1.9	11.5	45.8	.76	------	.032	.050	.36	tr
(a)	Niyog	------do	------do	67.9	58.9	.816	24.76	1.06	2.0	11.8	82.5	1.63	0	.029	.022	.38	2.6
(b)	Niyog, gata	------do	Coconut, milk	100	------	1.260	------	1.52	------	14.1	131.9	1.37	------	.016	.017	.33	tr
(c)	Niyog, tumbong	------do	Coconut cotyledon	98.7	83.2	.241	1.90	1.60	1.2	27.1	69.1	1.01	------	.020	.049	1.24	8.2
	Paayap	*Vigna sinensis* L.	Cowpea (short var)	100	14.0	3.490	1.31	3.27	2.8	100.6	420.4	8.71	.005	.466	.269	2.06	------
	Patani	*Phaseolus lunatus* L.	Lima beans	82.7	67.5	1.580	.51	1.66	.7	20.2	121.7	3.82	.093	.043	.110	1.33	27.2
	Pili	*Canarium ovatum* Eng.	Pili nut	16.3	2.2	2.200	37.51	2.49	2.5	108.6	496.9	3.15	.009	1.052	.113	.52	tr

TABLE 2.—*Scale used in rating some of our common vegetables in their vitamin and mineral content per 100 grams of food.*

	Requirement NRC of P.I.	Excellent above	Good	Fair	Poor below
Vitamin A (International Units)	4,000	5,000	2,500 to 5,000	500 to 2,500	500
Thiamine (milligrams)	1.4	.4	.2 to .4	.050 to .2	.050
Riboflavin (milligrams)	2.0	.5	.3 to .5	.1 to .3	.1
Ascorbic Acid (milligrams)	70	70	35 to 70	10 to 35	10
Niacin	14	4	2 to 4	.5 to 2	.5
Calcium (milligrams)	700	100	50 to 100	20 to 50	20
Phosphorus (milligrams)		150	75 to 150	50 to 75	50
Iron (milligrams)	10	10	5 to 10	1 to 5	1

SUMMARY

The analyses of 167 samples of foods which represent 120 food items are reported for moisture, nitrogen, crude fiber, fat, ash, calcium, phosphorous, iron, carotene, thiamine, riboflavin, niacin, and ascorbic acid. The wide range in values in the same food plant of different origin especially in minerals and vitamins, indicate the need for several analyses before representative values can be obtained.

A short description of each food studied is given.

Outstanding foods that may be considered excellent or good sources of two or more nutrients are *kulitis*, bitter melon tops, *malunggay* leaves, taro leaves, pepper leaves, potherb, mustard leaves, garland chrysanthemum (*tañgo*), sweet potato tops, mung bean, kidney bean, soybean, peanut, chickpea, cashew fruit and nut, chili, guava, mango, and *himbabau* flowers.

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The authors are also indebted to the College of Agriculture, University of the Philippines; to the Bureau of Plant Industry, Manila; and to many of their friends and colleagues who have supplied the laboratory of the Institute of Nutrition with food samples not available in Manila.

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BOOKS

Books received from time to time by the Philippine Journal of Science are reviewed and acknowledged in this section.

Chemistry of Food and Nutrition. By Henry C. Sherman. 8th edition. New York, The Macmillan Company, 1952. 721p. Price, $6.00

The continued revision of this book, of which the present is the eighth, shows the wide acceptance it has enjoyed for the last forty or more years.

Such principles of food and nutrition as are deemed important in an effective grasp of the subject are, as a whole, presented in the book. Painstaking efforts have also been made to summarize present knowledge of the subject by critically presenting its background and present status.

Of the 34 chapters in the book, twelve are devoted to the presentation of the basic chemistry of carbohydrates, fats, lipoids, proteins, minerals, and vitamins; two, to the general discussion of enzymes, digestions and metabolism of foodstuffs, three, to energetics; and the rest to various aspects of nutrition, such as those dealing on reproduction and lactation, growth and development, dietary adequacy, nutritional status, trends of food consumptions, and others. There are appendices on the proximate composition and energy values of foods, the mineral elements in food, and the vitamin values of foods.

The discussion on the chemistry of food constituents, although presented in a simple language, is not as authoritative, complete, and up-to-date as other published monographs on carbohydrates, proteins, lipoids, and others. Intermediary metabolism is not discussed. To fully comprehend the discussion therein presented, one needs to have a knowledge of organic chemistry.

The copious references and suggested reading matters at the end of each chapter are by way of enabling the reader to get more detailed discussions on such matters as he may be interested in.—F. A. S.

The Characterization of Organic Compounds. By Samuel M. McElvain. Revised edition. New York, The Macmillan Company, c1953. 303p. Price, $4.50

Designed as a textbook for a course in the identification or characterization of organic compounds, this revision of the present book retains the main features of the first edition. These features include an outline of a procedure for the characterization of organic compounds, the determination of physical constants, and the solubilities of organic compounds.

The appendices include complete lists of experiments and of compounds and reagents required for experiments of certain chapters in the text.

Written in a clear and direct style, the book is a valuable reference material for students of chemistry.—S. S. T.

PUBLICATIONS AVAILABLE

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